THE JOURNAL OF

MEDICAL EDUCATION

OFFICIAL PUBLICATION OF
THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

MARCH 1960 • VOLUME 35 • NUMBER 3

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The Journal of Medical Education is owned by the Association of American Medical Colleges and published monthly by the University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. Second-class postage paid at Chicago, Illinois.

Subscription Rates: $7.00 per year, $13.50 two years, $19.50 three years, $1.00 per single copy; foreign, $8.00 per year, $15.50 two years, $22.50 three years, $1.25 per single copy; Pan America and Canada, $7.50 per year, $14.50 two years, $21.00 three years. Supplements, $2.00.

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Medical Education Forum includes editorials, letters, comments, criticisms, and excerpts from important addresses.

News from the Medical Schools: Material for this section should be transmitted to the News Editor, Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois. Announcements of major faculty and administrative appointments, news of distinguished visitors and significant educational developments will be included. It is not possible to publish notices on grants-in-aid for scientific research.

Items of Current Interest: Audio-visual news and notices from national and federal agencies appear in this section.

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GALLAGHER'S
MEDICAL CARE OF THE ADOLESCENT

By **J. ROSWELL GALLAGHER**, M.D.
Chief, Adolescent Unit, The Children's Hospital, Boston,
Lecturer on Pediatrics, Harvard Medical School

With **THE STAFF PHYSICIANS**
The Adolescent Unit, The Children's Hospital, Boston

This new book is about adolescents themselves and the many illnesses, injuries, and personality difficulties experienced by boys and girls between the ages of 12 and 21. It is directed to all who care for their health: general practitioners, pediatricians, internists, various other specialists, college and school physicians, public health workers, nurses, and medical students. In short, it hopes to be of value to all who are concerned with the maintenance, improvement, or restoration of adolescents' health.

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Since adolescents are very different from children and from adults, considerable attention is devoted to describing their physiologic and their psychologic characteristics and needs and in pointing out how these affect the evaluation, the treatment, and the management of their disorders.

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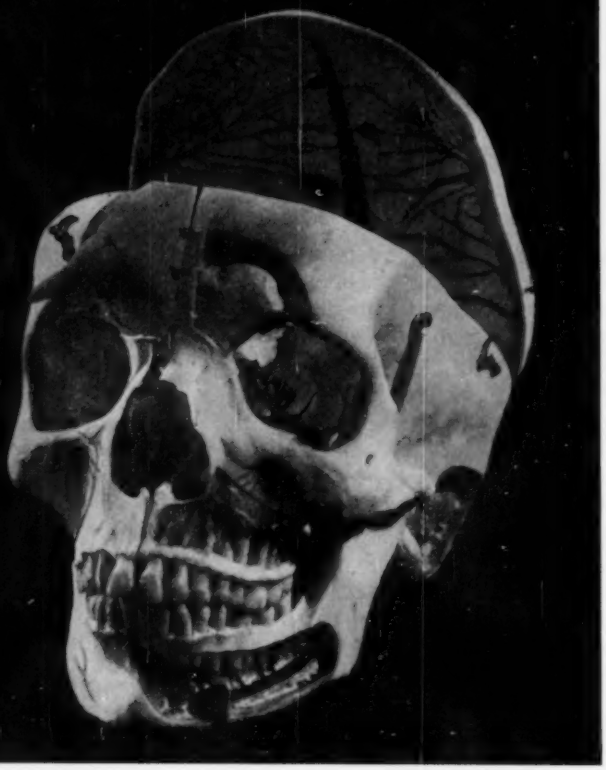

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71st Annual Meeting, October 31–Nov. 2, 1960

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1960

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APRIL

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SERGEI FEITELBERG, M.D.
Director, Physics Department, The Mt. Sinai Hospital; Associate Clinical Professor of Radiology, College of Physicians and Surgeons, Columbia University

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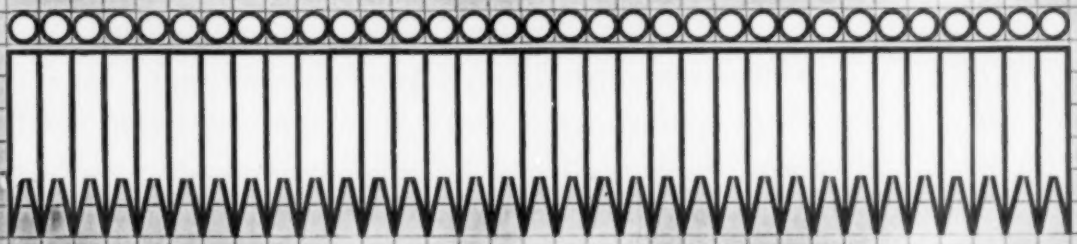

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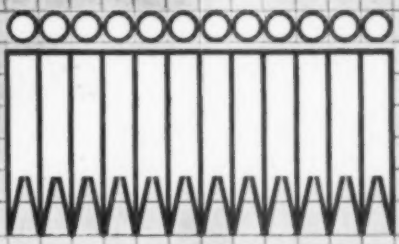

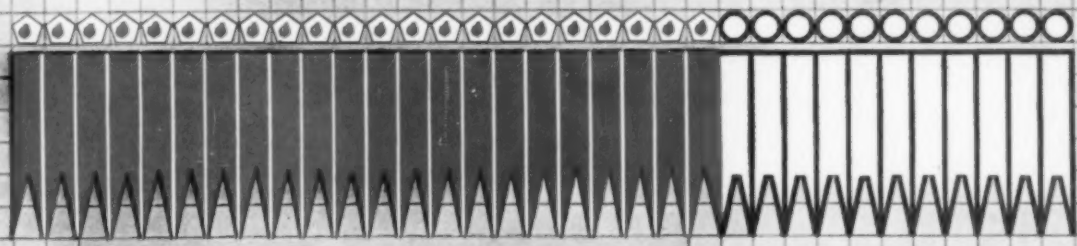

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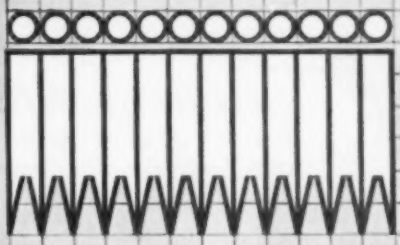

1. Boland, E. W., and Headley, N. E.: Paper read before the Am. Rheum. Assoc., San Francisco, Calif., June 21, 1958.
2. Bunim, J. J., et al.: Paper read before the Am. Rheum. Assoc., San Francisco, Calif., June 21, 1958.

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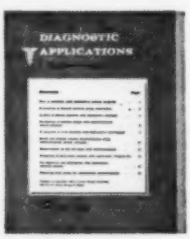

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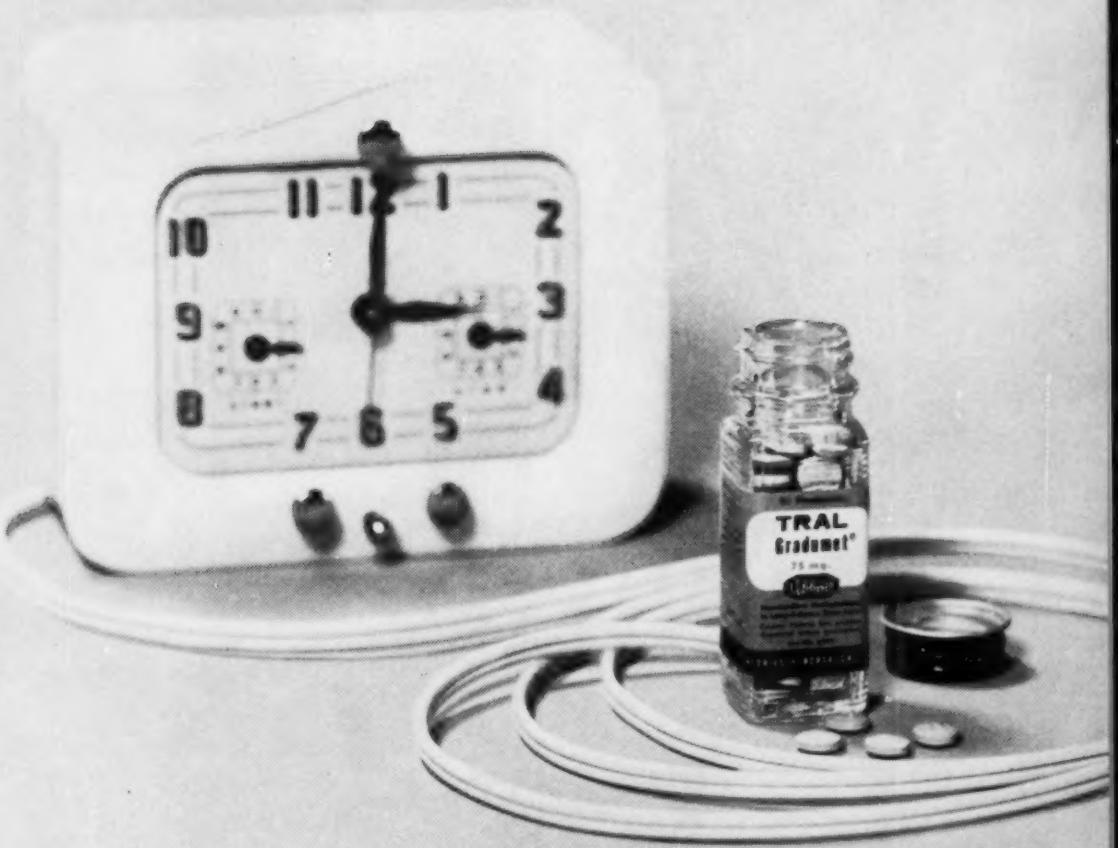

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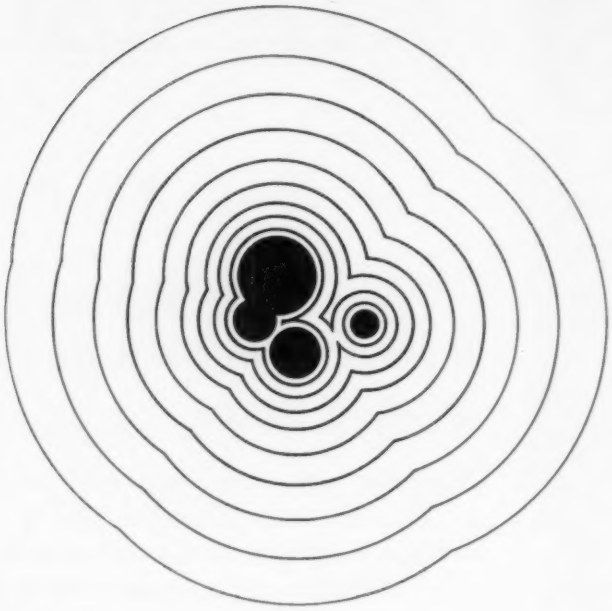

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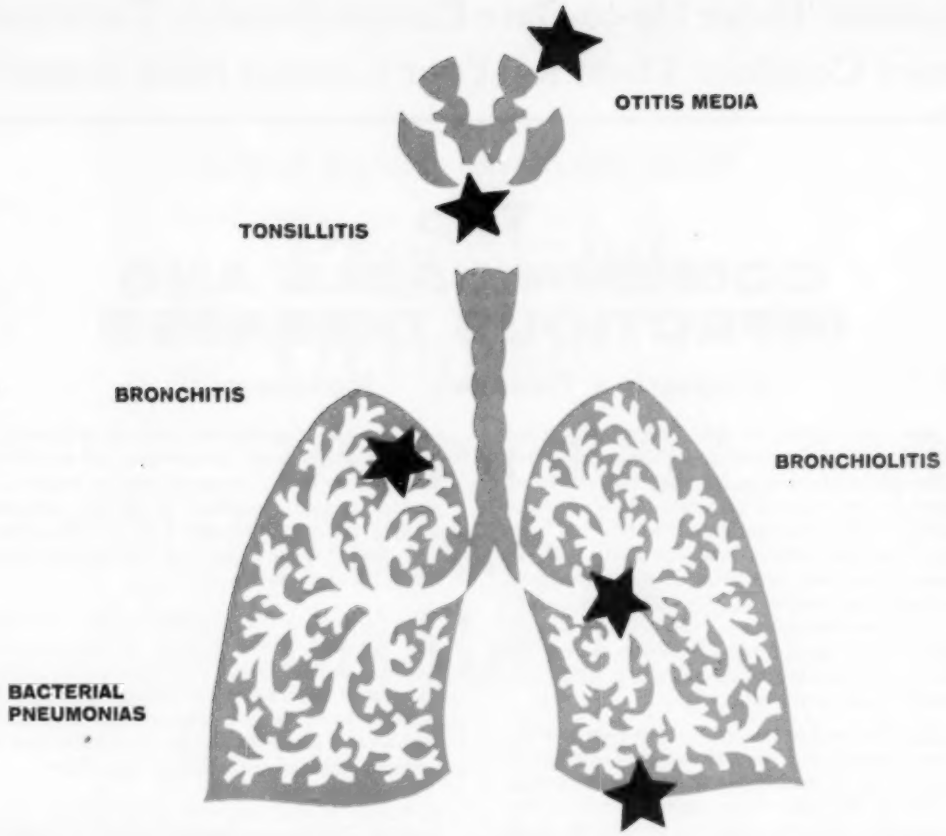

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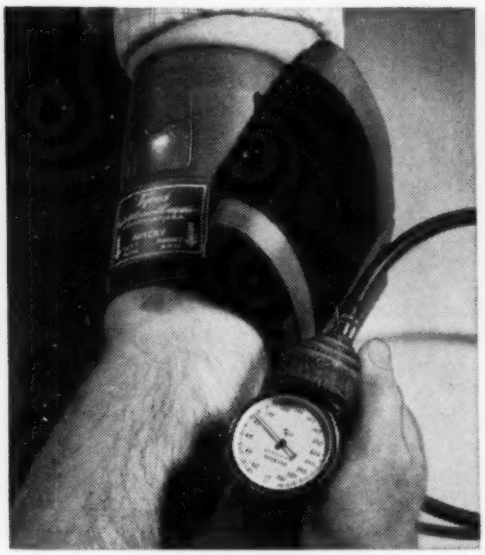

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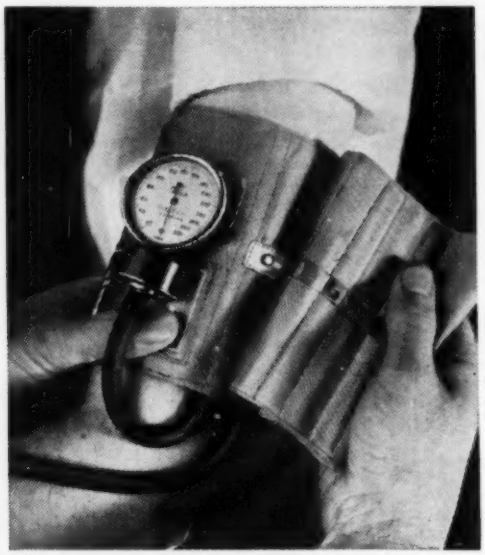

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The Teaching Hospital–Its Responsibilities and Conflicts*

ALBERT W. SNOKE, M.D.†

Grace–New Haven Community Hospital, New Haven, Conn.

I am delighted to have this opportunity of discussing with you "Medical Education in a Changing World." It is particularly appropriate in this period of economic and social change, that we look beyond the academic classroom and laboratory when medical education is concerned. This invitation is tangible evidence of at least the beginning of understanding and appreciation on the part of medical educators that the teaching hospital has a role in this confusing complex of health care and health education of present-day society. This interest has already been demonstrated concretely in the formation of the medical school-teaching hospital section of the Association of American Medical Colleges. Your inclusion of this subject on today's program is definitive proof of your recognition.

Doctor Darley's memorandum that was sent out when the plenary session for your annual meeting was first being developed presents the problem of relationships most clearly. He wrote: "Since the teaching hospital and the service programs attendant to it are beginning to emerge as resources for general higher education as well as for medicine, and since this raises many administrative, financial, philosophical and attitudinal problems, it is timely that this subject be given program status."

In the preparation of this paper a dilemma became obvious as soon as I searched for a title. The first title "The Teaching Hospital—Its Responsibilities and Conflicts" is frankly a little dull and unimaginative, but it at least does define the subject without leaping to any conclusions.

In an attempt to find a title that might be as descriptive but somewhat more provocative, three other possibilities came to mind.

1. "The Teaching Hospital—A Study in Institutional Schizophrenia."

2. "The Teaching Hospital—A Philosophical Paradox."

3. "The Teaching Hospital—A Tipsy Tripod."

All of these titles illustrate the general problem confronting our major teaching hospitals today, namely, to combine teaching, research, and service in such a manner as to satisfy the requirements of students, teachers, research workers and patients—and, one should not forget hospital administrators and the community. If this problem of combination is to be successfully solved, these three objectives should be equitably balanced.

All hospital administrators are concerned with this proper balance. Those in teaching

* Presented at the 70th Annual Meeting of the Association of American Medical Colleges, Chicago, Illinois, November 2, 1959.

† Director, Grace–New Haven Community Hospital, New Haven, Connecticut.

hospitals sometimes feel like the Farmer's Daughter who, in order to earn her daily bread, must address her posterior to a three-legged stool. Deans of medical schools with their faculty are the craftsmen who construct this stool. Two of its legs—those called Teaching and Research—receive their especially devoted attention; they maintain, strengthen, and occasionally lengthen them. They are the polished darlings of their professional pride.

The third leg is all too often a sort of parthenogenetic creation which is assumed to develop through its association with the other two. It is called Service or Patient Care.

As a professional Farmer's Daughter, I have an intense interest in, and dependence upon, all three legs, but every morning when I go out to do my chores, it is this third leg—the one called Patient Care—which upsets my equilibrium. As the other two legs grow in length and strength, the third leg has a very natural tendency to seem shorter and weaker.

An example of this imbalance in attitudes or emphases is in a recent issue of the *Journal of Pediatrics* (2) in which the Chairman of a University Pediatric Department states in the introductory editorial that "the role of a department which is restricted to the training of people for the practice of a specialty limits the importance of such a department and is not consistent with the definition of a university department. University Departments of Pediatrics at the present time must be devoted largely to research in human biology rather than the practical training of individuals, although this may be an important by-product of the activities of the department." And yet the editorial continues that "Universities must also supply leadership in the field of pediatric practice. The public is demanding that pediatricians care for all their children." The conflict in interest is apparent—yet the hospital care program is dependent upon this university department's attitude and philosophy. In this case, the Patient Care Leg is practically cut off at the seat!

The teaching hospital with which this paper is concerned is the major hospital center in which is based the main clinical teaching program of a medical school. Whether the medical school or the university owns and operates the hospital or whether the hospital is corporately independent is basically immaterial. The standards, program, philosophy, and atmosphere of the hospital are inextricably related to that of the medical school, and, with rare exceptions, the influence of the medical school is predominant. Although all hospitals can be considered "teaching" to a varying degree, the primary medical school-teaching hospital, with its alliance of clinicians, teachers, and researchers, its educational programs for all levels of physicians from the medical student to the practicing physician-specialist, and its tremendous potential service to patients and the community, can and should be a unique and wonderful institution which deserves our close attention and support.

We have been brought up to feel—and this would appear to be a universally accepted assumption—that the medical school-teaching hospital represents the finest in medical and hospital care that exists today. There was no question of this in the workshop conference on specialism in medicine at the 55th Annual Congress on Medical Education and Licensure in February, 1959 (3). "There was general agreement that research and teaching are inseparable, and it almost invariably follows that where these are of high level, patient care of good quality should result."

In spite of this pronouncement *ex cathedra*, it is appropriate to examine the relative excellence or emphasis in the three objectives of the teaching hospital and to evaluate as dispassionately as possible whether the quality of patient care or service really is as superlative as we would expect in this "best of all possible medical worlds."

The attitude, reputation, sense of community and social responsibility, treatment of patients, as well as the very financial stability of the hospital, are closely related

to and virtually determined by the medical school. Medical school teaching hospitals can be no better or no worse than the medical school, its faculty, and its philosophy cause it to be. The professors of the clinical departments in the medical school must of necessity be the chiefs of service in the hospital. The departmental members of the clinical Services from the intern to the senior faculty members under the departmental chairmen reflect the methods and approach of the medical school professor, who in turn is influenced by the medical school environment of this modern day.

There is no question as to their dedication and concern over the welfare of their patients, their long hours given unquestioningly to the seriously ill, and their consideration of the problem of the individual patient or his relatives. However, a fundamental question can be raised whether the modern medical school does not predispose to an overemphasis on research and teaching as contrasted to patient service.

Why may this be true? A prime factor may be the motivation of the faculty members. Why are they in this particular environment? It surely is not for the money, since incomes in teaching hospitals and in medical schools are notoriously below those in private practice. They are there because they desire more knowledge, and they like the academic environment as well as the teaching and research activities of the medical center. Their goal is promotion in the academic hierarchy and prestige in academic circles. Although money is not despised, it is not a dominant factor. If they wanted money, they would be caring for patients in private practice.

The criteria used for appointment or promotion are of importance in this connection. A man may be a superlative clinician, but how much consideration does he get if his bibliography is sparse to absent? What type of discussion goes on in the committee on promotion and advancement when a member of the clinical faculty is being considered for promotion and his teaching and clinical ability are excellent, but his interest in or time available for research is lacking. The preclinical faculty particularly tend to be critical toward any such unfortunate. In fairness to those concerned, it should be here noted that the establishment of adequate criteria for measuring either teaching pre-eminence or clinical excellence is not easy, whereas it is only too simple to read, weigh, or make a list of an individual's published items.

This situation is no secret among the younger faculty members of the medical school. Their time is jealously budgeted so that they can be "productive" in research. Many frankly admit that research takes precedence over patient service, since they feel that this is the path to academic advancement.

The medical student absorbs a great deal of his philosophy and attitude from the intern and resident staff, who, in turn, are closely associated with the younger instructors and assistant professors. The atmosphere in the medical school-teaching hospital is scientific, and the behavioral scientists would probably describe it as teaching- and research-oriented, as contrasted to patient-oriented.

Dean Lippard, in his address for the dedication of the Medical Center at Stanford University (4), recognized this possibility of over-emphasis in his comments. He referred particularly to Barzun's comments in "The House of Intellect" (1). "The name of research has changed from a simple description to a term of honor, and the occupation itself has acquired an inherent sanctity; the quality of the work and its results are secondary. This is shown by the fantastic estimate placed upon research in our seats of learning. To do research is deemed nobler than to teach; the men whose names bring prestige to a university are those whose research has impressed others of equal 'research potential.' For, I repeat, it is not deemed necessary to discover if only one 'produces,' production being defined as publication."

We only need to look at the budgets of individual clinical departments and to the

medical school in general to realize the disparity between funds available for general support of the educational and service program and those for research to understand why emphases on research cannot be ignored. If the recently published report of a committee appointed by the surgeon general of the U.S.P.H.S. (5) is correct, the amount of money invested in research in the medical sciences will increase from $330,000,000.00 in 1957 to one billion dollars by 1970 or sooner! No wonder we are faced with overemphasis on research.

This brings me to the role and responsibility of the university-teaching hospital in relation to our concept of the medical center of today and tomorrow. The teaching hospital is not merely a repository for vertical and horizontal patients who serve as teaching material for ward rounds, set-clinics, and object lessons. It is not just another department or unit of the medical school similar to that of the animal house, as was facetiously remarked by one of my academic friends some years ago. This teaching hospital is the most important laboratory that the medical school possesses or has access to for the training of the physician of whom we are all so proud, during his undergraduate, graduate, and postgraduate experience. This is the laboratory in which are taught, demonstrated, and carried out all the skills and philosophy of total patient care which the medical school expects its graduates to absorb and use in practice.

Modern patient care encompasses many disciplines and skills other than those supplied by the physician, or that can be taught by the medical school professor alone. Those services to the patient supplied by the nurse, the dietitian, the social worker, the multitude of different specialized technicians as well as the less highly trained hospital personnel who come in contact with the patient—all are fundamental to the provision of high quality patient care. The medical school wants its faculty and graduates to expect such care for their patients. They can demand such care and cooperate to produce it in the future only if they have been exposed to it in the learning environment.

This learning environment should be an example of the best type of medical, hospital, and community health care that it is possible to produce. This means care for patients with common and chronic complaints, not just the exciting, interesting, and rare cases. This means the assumption upon the part of the hospital administrator and the faculty that the hospital has community responsibilities to referring physicians and agencies, not selective admissions dependent upon the clinical interests of the faculty or the resident staff. This means the understanding that ambulatory care, out-patient services, and emergency facilities are vital aspects of community service and medical education that are worthy of the direction and participation of the senior members of the faculty, not the stepchild of the medical school because (quote): "you cannot get men who are worth anything to retain interest in out-patient activities." It means the recognition that medical students when they graduate into practice will be facing problems of long-term illness, of mental illness, of rehabilitation and of aging, and that the teaching hospital has a responsibility to provide an understanding environment to meet these problems. It means the understanding as described by Dean Brotherstone of Edinburgh that there is an artificiality of environment in a teaching hospital in which the medical student as a human biologist is seeing the fauna of his future practice strictly *in vitro*. It means the recognition that many of the patients in the clinics are unable to communicate their needs and fears. It means that the part-time clinical faculty are not second-class citizens and that the community physician is not automatically relegated to doddering ineffectiveness because he has left the sacred confines of the medical school. Finally it means that the word "crock" and all it connotates is a word removed from the medical vocabulary.

The teaching hospital would appear to be quite naturally of paramount importance

to the medical school—its reputation, financial stability, morale, community relations, and actual service to patients. This would sound logical, yet is not necessarily the case. The recent *Study of Twenty Medical Schools* by the U.S.H.P.S. (7) is an example of the preoccupation of the medical schools for everything except their main clinical laboratory. An exhaustive financial study, with many visits and interviews with deans, faculty, and university officials, resulted in a series of recommendations. Four had to do with research, one with construction of medical school facilities, and one for operating funds for medical schools. Apparently no one either in the Public Health Service or in the medical schools was interested in the financial problems of the teaching hospitals. Two schools out of seventeen placed "hospital beds for research" third and fourth on their priority. The financial stability, the provision of future service, the quality of the service rendered the patients in the institution upon which the medical school is dependent was taken for granted. If the animal has four legs, all types of funds may be tapped for care or study. If only two legs, let the hospital trustees and administrator worry about it.

It is a little hard to understand this apparent blind spot in thinking regarding the teaching hospital. It may be due to a seeming preoccupation with undergraduate medical education on the part of medical schools and a refusal or an inability to accept responsibility for the complete medical education of the physician. No one believes that a doctor can be trained in 4 years of a medical school. Intern and residency training as well as postdoctoral education are necessary, and Willard Rappleye reminded us last February at the American Medical Association Congress on Medical Education and Licensure (6) of the role of the hospital in this medical education.

The major teaching hospitals in this country are involved with the medical education of as many interns and residents as there are enrolled in the junior and senior classes of the medical schools. The medical school faculty are teaching these medical school graduates in these teaching hospitals, and these "clinical laboratories" are as essential and as important to the medical schools as are the laboratories of the department of anatomy.

It is understandable that there is concern for balancing the books of the medical school and that great emphasis is laid upon payment for overhead and for institutional grants to medical schools for undergraduate education. However, the question can be legitimately raised as to what financial means are available to cover the rest of the medical education spectrum?

It is encouraging that the report of the Surgeon General's Consultant Group on Medical Education has recognized and considered the problem of financing of the teaching hospital. This is a very important subject. Teaching hospitals have very serious financial problems, and many are related to their association with the medical school. Too little has been done to study hospital costs in relationship to the teaching program of the medical school. For the past 20 years, questions have been raised as to the role of the medical school in increasing the costs of a teaching hospital, and whether these increased costs are legitimate, because of the improved standards and greater variety of services, or whether medical school teaching and research costs enter in the hospital costs.

Teaching hospitals attract the more complicated and seriously ill patients and must provide complete medical and hospital services, frequently with little or no reimbursement, because this is what is expected of them. If the medical school is to do proper teaching and research, it must have adequate numbers of patients and be prepared to care for them in the most modern and approved manner. The means by which reimbursement is obtained is all too frequently dismissed as a problem for the hospital to solve, in spite of the fact that the medical school's needs and demands have caused some part of that financial problem in the first place.

It is time that these questions are answered and that careful study be given to the financial relationship between the medical school and the primary teaching hospital. Both hospitals and medical schools are having and will continue to have problems financing their operations. If both are to function in a harmonious partnership, it is essential that neither partner feel that one is carrying unfairly a financial burden that is the responsibility of the other. It is equally important that expenses be properly allocated so that the many outside agencies that are contributing to the financial support of the medical school or the hospital be satisfied that their funds are being used properly. Patients should pay the full cost of the services they receive, but should not pay a premium for teaching and research that is appropriately the responsibility of the educational institution. Educational funds that are sorely needed to pay adequate salaries to faculty, etc., should not be used to pay for patient care that is legitimately the responsibility of the patient or third party agencies. Insurance and governmental agencies that are having increased pressure placed upon them to pay the full cost of medical and hospital care for patients that are their responsibility are also concerned that educational or research costs are not included, or, if this cost is included, that it be identifiable.

A similar problem faces the community that is expected to support the hospital. A community hospital has definite responsibilities which the community should be expected to support financially. Teaching hospitals with higher or different standards and with more numerous and more expensive services can be expected to require additional financial support. It is possible that these different standards and services are essential and justifiable. However, it is necessary that their costs be identified wherever possible and that understanding reached as to where the local community financial responsibility ends and the need for outside funds occur.

Preliminary studies that have been made during the past 6 months in New Haven raise considerable doubt over the assumption that medical schools cause a substantial increase in the per diem cost of a primary teaching hospital, if proper allocations of expense are made between hospital patient service on the one hand and teaching and research of the medical school on the other. This will require a great deal more study before definitive conclusions can be reached, and will also be dependent upon adequate accounting and cost analyses.

The problem of the teaching hospital is not just the per diem expense of caring for the patient. Large sums are needed from endowments, gifts, grants, and subsidies to meet the problems concerned with occupancy, admissions, adjustments to teaching and research programs, requirement of large numbers of ward beds and large out-patient clinics with high expense and low income. In addition, if the teaching hospital lives up to its responsibility as the service unit of a medical center, it must be prepared to meet the demand for special diagnostic and therapeutic services excepted of it by its medical staff and the community. It also must participate in community activities. It should also undertake a program of education of ancillary medical personnel. Nursing education by itself, if it meets standards expected of the teaching hospital, may result in net losses of hundreds of thousands of dollars a year.

If the teaching hospital is to provide an environment that represents the best of total patient care, it must have the leadership, administration and support that will enable it to do so. Its program, its personnel, and its attitudes should be directed primarily toward the patient and the service that can be given the patient and the community. At the same time, the hospital Board and its administrator should not only understand but be sympathetic toward the research and educational needs of the medical school, and should do everything possible to further these aims, constantly keeping the patient and his welfare in mind.

If this is to be accomplished, administra-

tive and professional relationships between the hospital and the medical school need to be understood. The teaching hospital is not a sub-department of the medical school in which the administrator is busily engaged only in checking the temperature of the soup, the cleanliness of the corridors, or preparing brochures telling how fine everyone is. The teaching hospital should be a full partner with the medical school in all aspects of patient care. The administrator should be interested in research and teaching as it applies to the patient, in the long-range plans of the combined institution, in the problems faced by the various academic departments in carrying out their own responsibilities, but primarily in the care of the patient who comes to the hospital expecting to get the highest scientific care in a humane, understanding, and spiritual environment.

The administrator of the hospital should be just as concerned as the dean of the medical school and the professors of the clinical departments over the source and nature of patients that are necessary for teaching. The growth of third party medical insurance, with its consequent decrease in number of ward patients, and the problem of educating and financing the medical center resident staff are of vital importance to both partners. These are not academic or scientific problems—these are social and economic. Their solution will depend upon the ability of the dean and administrator to respect, appreciate, and complement each other.

In conclusion, it should be emphasized again that the primary teaching hospitals intimately associated with medical schools represent potentially the finest type of hospital and medical care that can be found any place in this country. These hospitals are dependent for these high standards upon the medical school and faculty. As emphasis upon science, research, and teaching grow in the medical schools in this country, a danger exists of over-emphasis in these two areas with a consequent decrease in individual patient care.

The teaching hospital is the environment in which students of medicine (both graduate and undergraduate) receive their education. Inasmuch as medical and hospital care today requires such varied facilities equipment, and trained personnel, the teaching hospital is the logical place to have them concentrated. Patient care, particularly from the individual point of view, may be lost in the expanding research and teaching atmosphere. It is the responsibility of the administration of the teaching hospital to see that this does not happen. This is not easy. However, it is an ideal worth striving for. The result is an institution which considers the person, not just the patient.

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Mathematical Models in Medical Diagnosis

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At the 1958 Annual Meeting of the Association of American Medical Colleges, Dr. Franklin D. Murphy, a physician and Chancellor of the University of Kansas, pointed out that mathematicians are in the process of reworking the whole concept of teaching twentieth-century mathematics to twentieth-century youngsters. He then suggested that medical educators hadn't really faced up to the problems of examining pedagogic techniques and efficiency of the teaching mechanism in medicine (16).

We believe that many medical educators are interested in new teaching methods. To them, to medical students, and to practicing physicians we wish to demonstrate that twentieth-century mathematics contains some disciplines which can be used to help teach medical diagnosis to twentieth-century medical students. In this paper mathematical models from symbolic logic, probability, and value theory are proposed as a mathematical basis for an analysis of the reasoning foundations of medical diagnosis. We believe these models can help the student learn more quickly and more precisely the logical processes which he needs to analyze the patient's medical data. However, the adept use of these processes will do very little to improve the accuracy of diagnosis if the information about the patient is inaccurate. Therefore, we have included a short discussion on the subject of observer error and the accuracy of diagnostic procedures.

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Some information on how this study started may interest the reader. Several years ago, as a result of the rapid advances made in electronic computer development, a number of electronic engineers and medical investigators became interested in determining whether computers could help the physician with medical diagnosis. The belief has been expressed that errors in diagnosis are more often errors of omission than of commission (17). Some important questions needed to be answered. Could an electronic computer with its extensive memory capacity and data-processing facility help the physician avoid some of the diagnostic errors of omission? Concerning errors of omission, Clendening says "How to guard against incompleteness I do not know. But I do know that, in my judgement, the most brilliant diagnosticians of my acquaintance are the ones who do remember and consider the most possibilities. Even remote ones should be brought up even though they may be immediately rejected" (5).

Could the computer be programmed to analyze the patient's signs and symptoms and to give a differential diagnosis? If the computer could be programmed to analyze the patient's data, should logical analysis processes be followed similar to those used by the physician? What are the reasoning foundations of medical diagnosis used by the physician? Diagnosis is, of course, a mental process, but what kind of mental process is it? (4).

It is obvious that this sequence of questions led us to a study of the logical processes used in medical diagnosis, a subject which has received very little attention in

medical text books published in this country. Perhaps we physicians have been more concerned with the laboratory aspects of medicine than with medical semiotics. If so, the most complicated electronic device yet introduced for medical research has redirected our attention to the logical analysis aspect of medicine.

It is interesting to note how a new technique often may stimulate the development of theory; "We are today witnessing a revival of a number of interests of the days of Descartes relating to animals and machines. The ideas arose in the seventeenth century but techniques for executing practical experiments were lacking; today we have the techniques and are casting back for threads of old ideas. The history of science shows countless examples of such theory-technique cycles" (3).

We realize that there are many factors involved in medical diagnosis and treatment which are intangible and are not susceptible to objective analysis. These factors involve value judgements of ethical, moral, and social considerations of great importance (18). However, after these judgements have been made, there remains an area of diagnosis which we believe can be analyzed. In an attempt to give a mathematical formulation to this portion of the medical diagnosis reasoning processes we considered our own medical experience, we analyzed a large amount of medical case material including clinico-pathological conference records, and we discussed the problem with other physicians.

In the presentation which follows, the mathematical models may be considered as a visual aid to help analyze signs and symptoms.

A LOGICAL ANALYSIS MODEL

There are three factors involved in the logical analysis of medical diagnosis, namely: medical knowledge which relates disease complex to symptom complex; the symptom complex presented by the patient; and the final disease complex diagnosis. Logical concepts inherent in medical diagnosis emphasize the fundamental importance of considering symptom complexes in conjunction with disease complexes (i.e., combinations of diseases) rather than an evaluation of each sign and symptom with respect to each possible disease. It is the combination of signs and symptoms which the patient does and does not have in relation to possible combinations of diseases that is of primary importance to the diagnosis.

Each of the three factors involved in the logical analysis of medical diagnosis can be expressed in terms of symbolic logic as a Boolean function. If $E[S(1), \ldots S(n), D(1) \ldots D(m)]$ is the function of medical knowledge relating n symptoms, $S(1) \ldots, S(n)$ to m diseases $D(1) \ldots, D(m)$ and if $P[S(1), \ldots, S(n)]$ is the function representing the patients' symptoms, then the diagnosis is obtained by finding a function $f[D(1), \ldots, D(m)]$ which satisfies the following fundamental formula: $E \rightarrow (P \rightarrow f)$.

The effect of medical knowledge embodied in the function P is to eliminate from consideration certain disease-symptom complex combinations which do not exist. The resulting diagnosis computed by means of logic is essentially a list of the possible disease complexes the patient can have which are consistent with medical knowledge and the patient's symptoms.

Before a logical analysis model can be demonstrated it is necessary to review briefly some symbolism associated with the propositional calculus of symbolic logic and the digital notation for this calculus. Suppose that the symbols $x, y, \ldots$ are used to represent "attributes" or symptoms[1] which the patient may have such as fever, leukocytosis, etc. The corresponding capital letters $X, Y, \ldots$ are used to represent statements about these attributes; for example, Y represents the sentence "The patient has attribute y." The negation of this sentence, namely, "The patient does *not* have attribute y" is represented by $\bar{Y}$, where a bar (—) (called

[1] In this paper the word *symptom* refers to all the data about a patient from the history, physical examination, laboratory examinations, and special tests.

negation) is placed over the Y to indicate "not." The combination $X \cdot Y$ represents the combined statements, "The patient has both attribute *x and* attribute *y*" where the dot (·) (called logical product) indicates "and." The combination of symbols $X + Y$ represents the combined statements, "The patient has attribute *x* or attribute *y* (or both)," where the plus (+) (called logical sum) indicates *or* (that is, the "inclusive or"). The sentence, "If the patient has attribute *x*, *then* he has attribute *y*" is symbolized by $X \rightarrow Y$. These symbols and their meanings are summarized below.

Symbol	Name	Interpretation
$\bar{Y}$	Negation	*Not Y*
$X \cdot Y$	Logical product	*X and Y*
$X + Y$	Logical sum	*X or Y* (or both)
$X \rightarrow Y$	Implies	If *X then Y*

That these propositional calculus functions can be displayed by a "1, 0" binary digit notation has been demonstrated by one of the authors (11, 12). With the digital notation a model can be constructed which helps to analyze patient data, and the model can be transferred to a digital computer.

To demonstrate the elementary computational technique we assume a simple situation involving two symptoms and two diseases. For this example a logical basis is constructed using binary notation which displays all conceivable combinations of attributes that the patient under consideration may have. For two diseases $D(1)$ and $D(2)$ the possible combinations are:

	d_1	d_2	d_3	d_4
$D(1)$	0	1	0	1
$D(2)$	0	0	1	1

where 0 indicates that the disease does not occur and 1 indicates that it does. Each column $d_1\ d_2\ d_3\ d_4$ represents a disease complex. For two symptoms $S(1)$ and $S(2)$ the possible combinations are:

	s_1	s_2	s_3	s_4
$S(1)$	0	1	0	1
$S(2)$	0	0	1	1

where each column $s_1\ s_2\ s_3\ s_4$ represents a symptom complex.

If we consider the four attributes: $S(1)$, $S(2)$, $D(1)$, and $D(2)$ then all conceivable combinations of disease and symptom complexes may be written in logical basis from as shown in Table 1.

Although a logical basis lists all conceivable symptom-disease complex combinations, it is obvious that many of these do not occur. Which combinations do occur or which do not occur is information included in the body of medical knowledge.

TABLE 1

LOGICAL BASIS FOR $S(1)$, $S(2)$, $D(1)$, AND $D(2)$

	s_1	s_2	s_3	s_4	s_1	s_2	s_3	s_4	s_1	s_2	s_3	s_4	s_1	s_2	s_3	s_4
$S(1)$	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
$S(2)$	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
$D(1)$	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
$D(2)$	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	d_1				d_2				d_3				d_4			

Suppose that one of the conditions from medical knowledge is $D(2) \rightarrow S(1)$: hence, columns s_1d_3, s_2d_3, s_1d_4, and s_2d_4 cannot occur, since these represent patients that have at least disease $D(2)$ but do not have symptom $S(1)$.

If we also have the condition $D(1) \cdot \overline{D(2)} \rightarrow S(2)$, then columns s_1d_2 and s_2d_2 are eliminated. The expression $\overline{D(1)} \cdot D(2) \rightarrow S(2)$ would eliminate columns s_3d_3 and s_4d_3 and $S(1) + S(2) \rightarrow D(1) + D(2)$ eliminates columns s_2d_1, s_3d_1 and s_4d_1. When these complexes have been eliminated there remains a reduced basis consistent with medical knowledge as shown in Table 2.

If a particular patient presents a particular symptom complex, what possible disease or disease complex does he have? Consider the patient who has $S(1) \cdot \overline{S(2)}$; then we must consider both column s_2d_3 and column s_2d_4. Thus, there are two possible disease

complexes which the patient may have: $\overline{D(1)} \cdot D(2)$ or $D(1) \cdot D(2)$. This means that the patient has $D(2)$ and that he may or may not have $D(1)$. Either further tests must be performed or else medical knowledge cannot tell whether or not the patient has $D(1)$ under these particular circumstances.

For complicated situations where more symptoms and diseases are involved, as would be found in an actual medical case, advanced computation techniques are needed (11, 12). A more detailed discussion of logical analysis in medical diagnosis has been presented elsewhere (13, 14), and it has been shown that the same logical analysis procedure may be used to help determine at any stage in the examination of the patient the minimum number of necessary diagnostic tests of the next order of complexity (14).

A PROBABILITY MODEL

In the preceding section statements were presented such as, "If a patient has disease 2 he must have symptom 2." Such positive statements have a place in considering symptom-disease complexes, but it is obvious that a more accurate statement would be, "If a patient has disease 2, then there is a certain *chance* that he will have symptom 2; i.e., perhaps 75 out of 100 patients will have symptom 2." Since "chance" or "probability" enters into "medical knowledge," then chance or probability enters into the diagnosis itself. At the present time very few specific symptom probabilities are known; medical textbooks, therefore, do not often give numerical values, although they may use words such as "frequently," "very often," "rarely," etc. Concerning this lack of symptom data Clendening and Hasinger observe, "There is no department of medical literature that is more improverished than that of clinical statistics" (5). We hope that more attention will be given to collection of clinical statistics. However, since we are considering these topics from an essentially academic point of view, we shall assume that the statistics are available, that the probabilities are known, and we shall discuss methods for utilizing such probabilities in medical diagnosis.

Suppose that it is not feasible to make further tests to distinguish between alternative diagnoses. The problem then is: Given the patient's symptoms complex (s_j), what is the probability that the patient has a particular disease complex (d_i)? This statement can be written $P(d_i/s_j)$, where the symbol to the right of the slash is the known symptom complex and the symbol to the left of the slash is the disease complex whose conditional probability is desired.

TABLE 2

THE REDUCED BASIS FOR $S(1)$, $S(2)$, AND $D(1)$, AND $D(2)$ WHICH INCLUDES MEDICAL KNOWLEDGE

	s_1	s_3	s_4	s_2	s_5	s_6
$S(1)$	0	0	1	1	1	1
$S(2)$	0	1	1	0	0	1
$D(1)$	0	1	1	0	1	1
$D(2)$	0	0	0	1	1	1
	d_1	d_2		d_3	d_4	

The composition of $P(d_i/s_j)$ may be given in terms of Bayes' theorem:

$$P(d_i/s_j) = \frac{P(d_i)\,P(s_j/d_i)}{\sum_{\text{all } k} P(d_k)\,P(s_j/d_k)}.$$

This theorem which gives an "inverse probability" was expressed by Reverend Thomas Bayes in 1763 and represents a mathematical basis of induction.[2]

The term $P(s_j/d_i)$ is the probability of having the symptom complex s_j when it is known that the patient has the disease complex d_i. Medical textbooks usually pre-

[2] Inductive probability is a mathematical field of interest which has been explored very little with respect to medical diagnosis. Yet it represents an important part of the diagnostic process. For discussions on inductive probability see:

1. Cherry, C. On Human Communications, p. 63. New York: Technology Press and John Wiley and Sons, Inc., 1957.
2. Luce, R. D., and Raiffa, H. Games & Decisions, p. 311. New York: John Wiley and Sons, Inc., 1957.
3. Carnap, R. Logical Foundations of Probability. Chicago: University of Chicago Press, 1950.

sent the disease-symptom information in this sequence although at present numerical probability values are not assigned, because the statistics are not available. The reason that textbook material is usually discussed in terms of $P(s_j/d_i)$ rather than $P(d_i/s_j)$ is that the disease gives rise to the symptoms. Therefore, it seems reasonable to assume that $P(s_j/d_i)$, which represents the symptoms from a particular disease complex, is a constant which is influenced very little by other circumstantial factors.

The term $P(d_i)$ is the probability that for a particular population of patients any particular patient in that population will have disease complex d_i. This term relates the changing influence of geographical, seasonal and epidemiological factors on the diagnosis.

The denominator $\sum_{\text{all } k} P(d_k)P(s_j/d_k)$ is a normalization factor where "all k" indicates a summation over all possible disease complexes d_k to be considered.

To illustrate a conditional probability model for medical diagnosis a simple illustration has been chosen which uses the logical basis from the preceding section (Table 3).

The lower row of numbers shows the number of patients with each symptom-disease complex combination. For convenience we have assumed that we are dealing with a defined patient population which totals 1000. We immediately observe that the conditional probabilities corresponding to the columns that were eliminated by medical knowledge are zero (see Tables 1 and 2). This is because these columns represent disease-symptom complex combinations which do not exist according to medical knowledge and hence there are no patients having these disease-symptoms complexes. The probabilities of the disease-symptom complexes which do exist are displayed in Table 4.

Suppose we assume, as we did in the preceding section, that the patient presents $S(1)\cdot\overline{S(2)}$. Logical analysis shows that the diagnosis is $\overline{D(1)}\cdot D(2) + D(1)\cdot D(2)$. This says that the patient has $D(2)$ but may or may not have $D(1)$. Which disease complex is more probable, $\overline{D(1)}\cdot D(2)$ or $D(1)\cdot D(2)$? To answer this question we use Bayes' theorem and substitute the calculated probabilities. Notice that $\overline{D(1)}\cdot D(2)$ occurs only in the d_3 complex; and $D(1)\cdot D(2)$ occurs only in the d_4 complex. Therefore we have

TABLE 3

NUMBER OF PATIENTS WITH EACH SYMPTOM-DISEASE COMPLEX COMBINATION

	s_1	s_2	s_3	s_4	s_1	s_2	s_3	s_4	s_1	s_2	s_3	s_4	s_1	s_2	s_3	s_4
$S(1)$	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
$S(2)$	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
$D(1)$	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
$D(2)$	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
No. of patients	910	0	0	0	0	0	30	20	0	25	0	0	0	10	0	5
		d_1				d_2				d_3				d_4		

TABLE 4

$P(s_1/d_1)=1,$	$P(s_2/d_1)=0,$	$P(s_3/d_1)=0,$	$P(s_4/d_1)=0,$	$P(d_1)=\frac{910}{1000}$
$P(s_1/d_2)=0,$	$P(s_2/d_2)=0,$	$P(s_3/d_2)=3/5,$	$P(s_4/d_2)=2/5,$	$P(d_2)=\frac{50}{1000}$
$P(s_1/d_3)=0,$	$P(s_2/d_3)=1,$	$P(s_3/d_3)=0,$	$P(s_4/d_3)=0,$	$P(d_3)=\frac{25}{1000}$
$P(s_1/d_4)=0,$	$P(s_2/d_4)=2/3,$	$P(s_3/d_4)=0,$	$P(s_4/d_4)=1/3,$	$P(d_4)=\frac{15}{1000}$

$$P(d_3/s_2) = \frac{P(d_3)P(s_2/d_3)}{P(d_1)P(s_2/d_1)+P(d_2)P(s_2/d_2)+P(d_3)P(s_2/d_3)+P(d_4)P(s_2/d_4)}$$

$$= \frac{\frac{(25\quad)}{(1000)}\cdot 1}{\frac{(910)}{(1000)}\cdot 0+\frac{(\quad 50)}{(1000)}\cdot 0+\frac{(\quad 25)}{(1000)}\cdot 1+\frac{(\quad 15)}{(1000)}\cdot\frac{2}{3}}$$

$P(d_3/s_2) = \frac{25}{25+10} = \frac{5}{7}$; This is the conditional probability for $\overline{D(1)}\cdot D(2)$.

and

$$P(d_4/s_2) = \frac{P(d_4)P(s_2/d_4)}{P(d_1)P(s_2/d_1)+P(d_2)P(s_2/d_2)+P(d_3)P(s_2/d_3)+P(d_4)P(s_2/d_4)}$$

$$= \frac{\frac{(\quad 15)}{(1000)}\cdot 2/3}{\frac{(910)}{(1000)}\cdot 0+\frac{(\quad 50)}{(1000)}\cdot 0+\frac{(\quad 25)}{(1000)}\cdot 1+\frac{(\quad 15)}{(1000)}\cdot\frac{2}{3}}$$

$P(d_4/s_2) = \frac{10}{25+10} = \frac{2}{7}$; This is the conditional probability for $D(1)\cdot D(2)$.

Hence, the chances are $\frac{5}{7}$ to $\frac{2}{7}$ or 5:2 that the patient has disease 2 but not disease 1, $[\overline{D(1)}\cdot D(2)]$ rather than "both disease 1 and disease 2," $[D(1)\cdot D(2)]$.

A VALUE THEORY MODEL

In the preceding discussion the model helped us to determine the more probable diagnosis. However, in actual practice, alternative diagnoses may remain after all tests have been made, and it may not be possible to determine the most likely diagnosis. At this point the value of treatments associated with the probable diagnoses must be considered. Often the treatment is a straightforward application of "currently accepted therapeutic measures." However, the choice of treatment may in some cases involve an evaluation of a "conflict situation" where ethical, moral, or economic factors are present in addition to the diagnosis. There is an interesting similarity between these value decision problems in the medical field and complicated decision problems in economic, military, and political fields. To deal with the economic and military problems mathematicians developed "Value Theory." To see how "value theory" may enter medical treatment, consider the following example. Suppose that there are 7000 patients, all with the same diagnoses, i.e., these patients may have disease complex d_3 with a probability of $\frac{5}{7}$, or disease complex d_4 with a probability of $\frac{2}{7}$. Also, let us suppose that there exists a treatment $T(1)$ which is 90 per cent effective (will cure 90 out of 100 patients) for disease complex d_3 and 30 per cent effective for disease complex d_4. If we use this treatment on all 7000 patients, how many should we expect to cure?

Number of patients with d_3

$$= \tfrac{5}{7}(7000) = 5000$$

Number of patients with d_4

$$= \tfrac{2}{7}(7000) = 2000$$

Then $T(1)$ should cure

$$5000\,\frac{(\quad 90)}{(100)} + 2000\,\frac{(\quad 30)}{(100)} = 4500$$

$$+ 600 = 5100 \text{ patients}.$$

A second treatment $T(2)$ is known to be effective also for both d_3 and d_4. It is only 10 per cent effective for d_3, but it is 100 per cent effective for d_4. The problem is: with which treatment, $T(1)$ or $T(2)$ should we expect to cure more patients?

Repeating the calculations to find the number of patients who should be cured by $T(2)$:

$$5000\,\frac{(\ 10)}{(100)} + 2000\,\frac{(100)}{(100)} = 500$$

$$+ 2000 = 2500 \text{ patients}.$$

Hence, we would expect to cure more patients with treatment $T(1)$. Although the preceding method was used to choose a treatment which would maximize the number of patients cured, the same argument can be applied to the individual patient. A little reflection will show that when maximizing the expected number of patients cured, we are actually maximizing the probability that any *individual* patient will be cured. To the practicing physician concerned with the treatment of each individual patient, this is what is most important.

This process of choosing the best treatment can be described in the terminology of games. There are in this game two players, the physician and Nature. The physician is trying to determine the best strategy (treatment of the patient) from his limited knowledge of Nature. The matrix representation of the game is shown below with the values of the *pay off* for each treatment. The model demonstrates what the physician will "win" and what nature will "lose."

		NATURE	
		d_3	d_4
THE PHYSICIAN	T_1	90/100	30/100
	T_2	10/100	100/100

It must be re-emphasized that the probabilities the physician would use in such a matrix are not available, because statistics have not been collected for most disease-treatment plan combinations. However, the physician frequently must make such value judgments. These he makes creditably well, based upon his past experience and his knowledge of the pertinent medical literature.

We believe that there is much to be gained from a study of value theory models for medical diagnosis and treatment. Such models help to separate the *strategy* problem from the *decision on values* problem and they help to solve the strategy problems. The decision on values problem involves ethical and moral questions which must be left to the physician to evaluate.[3]

OBSERVER ERROR AND THE ACCURACY OF DIAGNOSTIC PROCEDURES

At a recent conference on diagnostic data processing,[4] several physicians commented on the degree of inaccuracy found in clinical and laboratory procedures. They suggested that a system for logical analysis of medical data and the use of mechanical aids might help to improve diagnostic accuracy but that the real problem is to obtain more accurate patient data. That a surprising and clinically important degree of inaccuracy is to be expected in the interpretation or evaluation of many clinical and laboratory procedures has been pointed out in an excellent article by Garland (10). We agree that more studies need to be made concerning observer error in all branches of medicine to provide more accurate data for the clinician and for the medical student learning medical diagnosis. Since many physicians do not believe that a significant degree of error exists in their own field, several studies will be cited.

In the field of radiology a number of tests have been made on the accuracy of

[3] For a discussion of value theory and some interesting applications the reader should see J. D. Williams, The Compleat Strategyst. New York: McGraw-Hill Book Co., Inc., 1954.

[4] Proceedings of The Conference on Diagnostic Data Processing. The Rockefeller Institute for Medical Research, Jan., 1959. *In:* M. Eden (ed.), to be published.

interpretation of chest roentgenograms. Garland (10) points out that experienced interpreters of plain chest roentgenograms are apt to miss about 30 per cent of those films positive for roentgenologic evidence of disease, and to over-read about 2 per cent of those negative for disease. Further, this degree of error was found not only in the tests of serial roentgenograms but also in routine practice.

Five pediatricians (7) were asked to study 221 children and to classify them according to nutritional status. After making a complete clinical examination and using pertinent diagnostic tests, the pediatricians could agree on a diagnosis of malnutrition in only seven children, although a total of 90 had been so diagnosed by one or more of the examiners.

Fletcher (8) has reported the results of an interesting test which was made to assess the validity of some well known physical signs of pulmonary emphysema. For this test eight internists, all members of the Royal College of Physicians, were asked to examine the chests of twenty patients with emphysema. Each observer was asked to comment on ten signs which were listed in five out of six standard textbooks as present in emphysema. For most of the simple signs the physicians agreed in about 15 per cent of the cases, and on the signs of hyperresonance of the chest there was a 33 per cent disagreement. As a result of this study Fletcher made some observations which emphasize the need for more studies concerning observer error in clinical medicine:

"Presumably so little attention has been given by clinicians to the problem of error in assessing physical signs because they seldom hunt in couples of equal seniority" (8).

"The disagreements demonstrated in respect of simple hyperresonance were such as to suggest that, for instance, a refinement such as skodiac resonance should be discarded" (9). "Such refinements of physical examinations should be subjected to the test of observer error before they are published in our textbooks and journals and taught to students" (9). [And] "In the light of such an experiment, it might be possible to reject some of the traditional signs and we might in this way lessen the burden we at present lay upon students of medicine who have to learn so many clinical methods based upon tradition rather than upon experimental" (8).

Some other studies which deal with the problem of diagnostic procedure accuracy are: (*a*) variation in interpretation of electrocardiograms (6); (*b*) physician opinion on advisability of tonsilectomy in 1000 children (1); (*c*) the variation in results of chemical analysis of standard solution in 59 different hospital laboratories (2); and (*d*) the fluctuation of the erythrocyte count under standard laboratory conditions (15).

SUMMARY

The use of logical analysis in medical diagnosis has received little attention in medical texts and in medical student teaching in this country.

Models from symbolic logic, probability, and value theory are proposed as a mathematical basis for logical analysis in diagnosis and treatment.

The interest in logical analysis and in the use of machine aids to diagnosis has reemphasized our need for more accurate medical data.

A substantial contribution to the teaching of medical diagnosis and to the accuracy of diagnosis can be made by studies in all fields of medicine on observer error and the accuracy of diagnostic procedures.

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The Future Supply of Medical Students in the United States

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INTRODUCTION

The population of the United States is expected to increase from 177,128,000 in July, 1959, to 195,747,000 in 1965, to 213,810,000 in 1970, and to 235,246,000 in 1975.[1] As a consequence, there is likely to be an ever growing demand for skilled tradesmen, scientists, technicians, and professional workers of all kinds including, of course, medical practitioners. This report presents an attempt to project the future supply of medical students, including the number of applicants and of acceptances for admission to our colleges of medicine and schools of basic medical sciences, along with the number of freshmen in and graduates of these institutions.

THIRTY-FIVE YEARS OF ACTUAL DATA

Table 1 provides certain data for the past 35 years which are basic to this problem of projection. Because of the effects of World War II, first in reducing and then in augmenting, in both cases drastically, the numbers of men receiving baccalaureate degrees from our colleges and universities, it is desirable to deal with the men separately, although the data for the two sexes combined must also be considered. This table is of interest in and of itself, but it also provides the basis for certain calculations given in succeeding tables.

Column 2 of Table 1 indicates that the number of 21-year-old men in the United States fluctuated somewhat between 1924–25 and 1958–59, but it was about 22 per cent greater in the latter year than in the former. According to column 3, however, the number of first-level degrees awarded to men multiplied almost 4½ times during this same period. This column (among others) reflects the effects of World War II during the 1940's and the early 1950's.

Column 4 relates to what has been called the applicant base group for men, the data shown for any given year being derived by taking 25 per cent of the first-level degrees in that same year plus 75 per cent of such degrees in the preceding year (column 3). This basis was used because in recent years about 75 per cent of first-year medical students have had four years of premedical education, and the other 25 per cent have had three years. Thus, column 4 shows the size of the reservoir of potential applicants for admission to medical colleges each year.

Columns 5 through 8 of Table 1 relate to men only, but the same types of data are shown in columns 9 through 12 for the two sexes combined. Data on applicants and acceptances are not available for some of the years covered by the table, and, because of the accelerated programs followed by the medical colleges during World War II, the number of freshmen indicated for any one of these years cannot be related directly to the number of graduates for the fourth year later shown on the same line.

Column 5 reveals a decrease in the number of men applicants from 11,680 in 1932–33 to 11,168 in 1939–40, even though the applicant base group (column 4) increased

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[1] Bureau of the Census, *Current Population Reports—Population Estimates*, Series P-25, Nos. 204 and 187 (Series II projections).

TABLE 1

BASIC DATA CONCERNING STUDENTS IN ALL MEDICAL COLLEGES AND SCHOOLS OF BASIC MEDICAL SCIENCES IN THE UNITED STATES; FOR MEN SEPARATELY, AND FOR MEN AND WOMEN COMBINED; 1924–25 TO 1958–59

		DATA FOR MEN ONLY						MEDICAL COLLEGE DATA FOR MEN AND WOMEN COMBINED			
					Medical college						
YEAR	21-year-olds*	First-level degrees†	Applicant base group‡	Applicants§	Acceptances#	Freshmen‖	Grads. 4th yr. later**	Applicants††	Acceptances††	Freshmen§§	Grads. 4th yr. later##
1	2	3	4	5	6	7	8	9	10	11	12
1924–25	976,159	58,400	55,781			5,223	4,055			5,492	4,262
1925–26	977,651	61,936	59,284			5,477	4,232			5,753	4,446
1926–27	1,033,038	64,800	62,652	9,825	6,144	5,837	4,361	10,250	6,420	6,099	4,565
1927–28	1,040,739	67,689	65,522	10,822	6,217	5,932	4,518	11,287	6,496	6,199	4,735
1928–29	1,084,190	70,400	68,367	11,890	6,509	6,013	4,728	12,420	6,794	6,277	4,936
1929–30	1,112,453	73,165	71,091	13,174	6,720	6,166	4,681	13,655	7,035	6,457	4,895
1930–31	1,073,756	78,200	74,423			6,178	4,824			6,456	5,035
1931–32	1,096,056	83,271	79,468			5,997	4,894			6,260	5,101
1932–33	1,137,708	82,400	83,054	11,680	7,004	6,118	4,937	12,280	7,357	6,426	5,183
1933–34	1,127,791	82,341	82,385	11,621	7,262	6,188	5,139	12,128	7,578	6,457	5,377
1934–35	1,139,079	81,500	82,131	12,143	7,035	6,157	4,957	12,779	7,419	6,481	5,194
1935–36	1,124,823	86,067	82,642	12,051	6,521	5,800	4,829	12,740	6,900	6,125	5,089
1936–37	1,148,466	87,000	86,300	11,533	6,092	5,692	4,844	12,192	6,465	6,030	5,097
1937–38	1,126,229	97,678	89,670	11,558	6,069	5,598	4,995	12,207	6,410	5,911	5,275
1938–39	1,137,402	108,600	100,409	11,489	5,901	5,572	4,884	12,131	6,223	5,884	5,163
1939–40	1,178,806	109,546	108,837	11,168	5,890	5,618	4,982	11,800	6,211	5,914	5,223
1940–41	1,157,971	105,900	108,635	11,269	6,025	5,659	4,643	11,854	6,328	5,957	5,134
1941–42	1,207,197	103,889	105,397	11,304	6,497	5,944	10,043	11,940	6,822	6,218	10,305
1942–43	1,263,283	93,600	101,317	13,233	6,464	6,091	5,584	14,043	6,835	6,425	5,826
1943–44	1,195,192	55,876	84,169			12,483	6,047			13,209	6,389
1944–45	1,213,737	57,300	56,232			6,053	5,151			6,523	5,543
1945–46	1,215,266	58,945	57,709			5,454	4,482			6,060	5,094
1946–47	1,171,561	110,500	71,827			5,908	4,958			6,564	5,553
1947–48	1,161,323	176,146	126,912	17,779	6,082	6,059	5,667	18,829	6,512	6,487	6,135
1948–49	1,144,154	264,222	198,167	22,842	6,569	6,300	5,729	24,242	6,973	6,688	6,080
1949–50	1,147,886	329,819	280,623	23,044	6,750	6,648	6,305	24,434	7,150‡‡	7,042	6,668
1950–51	1,086,550	279,343	317,200	21,049	6,869	6,846	6,501	22,280	7,254	7,229	6,861
1951–52	1,083,430	227,029	266,264	18,811	7,241	7,112	6,632	19,920	7,663	7,518	6,977
1952–53	1,099,310	200,820	220,477	15,742	7,335	7,127	6,505	16,763	7,778	7,542	6,845
1953–54	1,065,240	187,500	197,490	13,706	7,276	7,080	6,466	14,678	7,756	7,524	6,796
1954–55	1,060,860	183,602	186,526	13,639	7,402	7,203	6,506	14,538	7,878	7,646	6,861
1955–56	1,087,780	199,571	187,596	13,935	7,465	7,277	6,762	14,937	7,969	7,742	7,118
1956–57	1,100,520	222,738	205,364	14,837	7,702	7,501	7,000	15,917	8,263	8,014	7,368
1957–58	1,127,780	242,948	227,792	14,801	7,815	7,572	7,014	15,791	8,302	8,030	7,383
1958–59	1,192,870	257,000	246,461	14,232	7,876	7,674	7,101	15,170	8,366	8,129	7,474

NOTES TO TABLE 1

* Column 2 through 1949–50 presents decennial census data or interpolations thereof; for the later years the column presents projections of census data, with allowances made for deaths and changes due to migrations.

† The data in column 3 for the years 1924–25, 1926–27, 1928–29, 1930–31, and 1944–45 represent interpolations; the data for the even years 1932–33 and thereafter through 1942–43, and for 1958–59, are estimates based on the number of first-time students 4 years earlier and other data; the figure for 1946–47 was estimated on the basis of data for Illinois.

‡ The derivation of the applicant base group data in column 4 is explained in the text.

§ The entries in column 5 for 1926–27, 1927–28, 1928–29, and 1932–33 were estimated from the total number of applicants by men and women combined in the given year and from data on both applicants and applications for each sex in 1933–34. The entries for 1946–47 and 1947–48 represent estimated breakdowns, between the two sexes, of the total for men and women combined for each year.

The entries in column 6 for 1926–27, 1927–28, 1928–29, and 1932–33 were estimated from the total number of acceptances by men and women combined in the given year and from data on acceptances for each sex in 1933–34.

‖ The derivation of the number of freshmen in column 7 from total freshmen in column 11 is explained in the text. Separate data for each sex are not available.

** The numbers of graduates for the last 4 years shown in column 8 (that is, graduates of the years 1958–59 through 1961–62) were derived from estimates of the total (men and women combined) graduates for those years; see footnote ##.

†† The data in columns 9 and 10 for the years 1949–50 through 1954–55 exclude applicants (or acceptances) for admission to the University of Puerto Rico School of Medicine but include applicants from U.S. Territories and Possessions for admission to all medical colleges in Continental United States. The data from 1955–56 on include the University of Puerto Rico.

‡‡ Estimated from the number of Medical College freshmen in that year (1949–50, column 10) since actual data are not available.

§§ Column 11 includes estimates of the number of freshmen enrolled in Rush Medical College during the years 1934–35 through 1940–41, since these data were not available. The figures in this column also include estimates of 52 freshmen for the University of Puerto Rico in 1950–51, 1951–52, and 1952–53, 30 in the University of California at Los Angeles in 1951–52, and 35 each in the next 2 years, and 30 in the University of Miami in 1952–53, 40 in 1953–54, and 70 in 1954–55.

The data in column 12 include (1) for the earlier years, graduates of class B and C, or unapproved Medical Colleges, as long as any were in existence, and (2) for the later years, graduates of the University of Puerto Rico from the beginning of its full operation. The total numbers of graduates shown for the last 4 years (on the lines for 1955–56 to 1958–59 but pertaining to 1958–59 to 1961–62) are estimates based upon the number of freshmen four years earlier.

Sources: "The Study of Applicants," *The Journal of Medical Education;* "Medical Education in the United States and Canada," *Journal of the American Medical Association;* United States Census Bureau, *Decennial Census Reports;* and United States Office of Education, Bulletins and Circulars, all for the period involved.

from 83,054 to 108,837 between the same two years. The number of acceptances (column 6) also dropped during this period, namely, from 7,004 to 5,890, as did the number of medical college freshmen (column 7), which decreased from 6,118 to 5,618. These declines in acceptances and in freshmen, which were due almost entirely to many medical colleges' reduction of their first-year classes, might have been much more nearly of the same magnitude, except for the fact that these institutions apparently expected a much larger shrinkage from accepted applicants to enrolled first-year students during the early 1930's than they did before and after these depression years. A comparison

TABLE 2

THE PERCENTAGE WHICH MEN MEDICAL COLLEGE APPLICANTS, ACCEPTANCES, FRESHMEN, AND GRADUATES WERE OF THE MALE APPLICANT BASE GROUP; ALSO THE NUMBER OF TOTAL (MEN PLUS WOMEN) GRADUATES PER 1,000,000 OF TOTAL U.S. POPULATION; 1924–25 TO 1958–59. (DERIVED FROM BASIC DATA IN TABLE 1.)

	Percentages for:				Number of graduates per 1,000,000 population*
Year	Applicants	Acceptances	Freshmen	Graduates*	
1	2	3	4	5	6
1924–25			9.36	7.27	35.4
1925–26			9.24	7.14	36.5
1926–27	15.68	9.81	9.32	6.96	37.1
1927–28	16.52	9.49	9.05	6.90	38.2
1928–29	17.39	9.52	8.80	6.92	39.5
1929–30	18.53	9.45	8.67	6.59	39.0
1930–31			8.30	6.48	39.9
1931–32			7.55	6.16	40.1
1932–33	14.06	8.43	7.37	5.94	40.5
1933–34	14.11	8.81	7.51	6.24	41.7
1934–35	14.79	8.57	7.50	6.04	40.0
1935–36	14.58	7.89	7.02	5.84	38.9
1936–37	13.36	7.06	6.60	5.61	38.6
1937–38	12.89	6.77	6.24	5.57	39.5
1938–39	11.44	5.88	5.55	4.86	38.3
1939–40	10.26	5.41	5.16	4.58	38.2
1940–41	10.37	5.55	5.21	4.27	37.1
1941–42	10.73	6.16	5.64	9.53	73.6
1942–43	13.06	6.38	6.01	5.51	41.2
1943–44			14.83	7.18	44.3
1944–45			10.76	9.16	37.9
1945–46			9.45	7.77	34.1
1946–47			8.23	6.90	36.6
1947–48	14.01	4.79	4.77	4.47	39.7
1948–49	11.53	3.31	3.18	2.89	38.7
1949–50	8.21	2.41	2.37	2.25	41.8
1950–51	6.64	2.17	2.16	2.05	42.0
1951–52	7.06	2.72	2.67	2.49	42.0
1952–53	7.14	3.33	3.23	2.95	40.4
1953–54	6.94	3.68	3.59	3.27	39.5
1954–55	7.31	3.97	3.86	3.49	39.4
1955–56	7.43	3.98	3.88	3.61	40.2
1956–57	7.23	3.75	3.65	3.41	40.9
1957–58	6.50	3.43	3.32	3.08	40.3†
1958–59	5.78	3.20	3.11	2.88	40.1†

* These data relate to the fourth year later than the one shown in column 1.

† Based on population data which are interpolations of projections for 1960 and 1965.

of the data in columns 6 and 7 shows that these expectations actually materialized.

During the period 1947–48 to 1958–59, the number of acceptances (column 6 of Table 1) underwent a steady increase from 6,082 to 7,876. The number of applicants (column 5) rose at first with the increasing applicant base group (column 4), but the former began to decline in the year in which the latter reached its peak. The number of applicants was considerably less in 1958–59 than in 1951–52, but the size of the applicant base group differed relatively little in these two years. It is also apparent that, even with the increases in applicants after the low point in 1954–55, their numbers represented smaller proportions of the base group than they did in the late 1940's.

Column 8 shows an increase from 4,055 men graduates out of the entering class of 1924–25 to 7,101 out of the freshmen of 1958–59, a growth of 75.1 per cent. During this same period the number of freshman men (column 7) rose from 5,223 to 7,674, or by 46.9 per cent. These percentages, as well as a comparison between these two columns at the beginning and at the end of the period, reveal the improvement in survival rates which has taken place in our medical colleges.

TRENDS IN THE SUPPLY OF MEDICAL STUDENTS

The foregoing facts concerning columns 4 through 8 of Table 1 suggest a more exact determination of the interrelationships of these data. These relationships, expressed as percentages in columns 2 through 5 of Table 2, make possible comparisons among applicants, acceptances, freshmen, and graduates over the period of years shown by reducing them all to identically the same basis—namely, the proportion which they constituted of the applicant base group. These data, which relate to men only, are presented graphically in Chart 1.

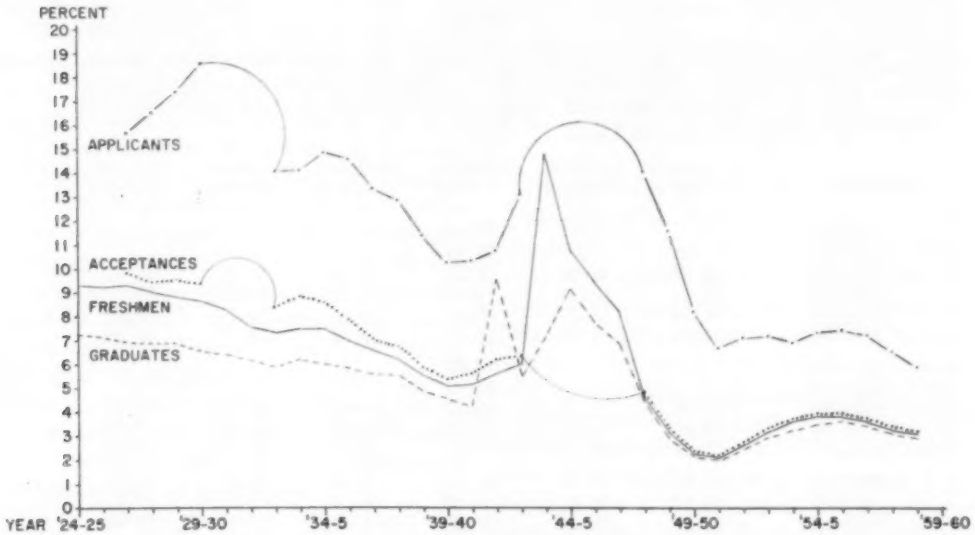

CHART 1.—Percentage of the applicant base group included in each of four groups of medical students: applicants, acceptances, freshmen, and graduates in the fourth later year; 1924–25 to 1958–59. The data portrayed are presented in Table 2, columns 2–5.

In view of the close parallelism between the curves for freshmen and acceptances in Chart 1, it is probable that the graph for the latter for the years for which it is broken would follow that for the former if the missing percentages were known. The parallel-

ism is due, of course, to the dependence of the acceptances upon the number of places available for freshmen. In general, if the disturbances resulting from World War II are taken into account, the curves for acceptances, freshmen, and graduates reveal a rather close parallelism, this relationship being particularly striking since 1947–48. Earlier in the period covered by the data these curves moved closer and closer together with the passage of time, the reason for which will become clear presently (from Table 3).

The inverse relationship between the curve for applicants and that for freshmen during the earliest years shown is difficult to explain unless the reports on applicants were incomplete at first or unless the definition of an applicant as actually applied became broader during the first few years. In the latter event, the definition must have been delimited when collection of statistics was resumed in 1932–33. Because of this situation it is impossible to theorize about the nature of the curve for applicants for the missing years in the early 1930's.

TABLE 3

SURVIVAL OF MEN MEDICAL STUDENTS THROUGH VARIOUS STAGES, EXPRESSED AS A PERCENTAGE THAT THOSE IN THE SAME INITIAL GROUP AT A GIVEN LATER STATE OF PROGRESS WERE OF THOSE AT SOME GIVEN EARLIER STAGE; 1924–25 TO 1958–59. (BASED ON TABLE 1.)

Year	Acceptances/ applicants	Freshmen/ acceptances	Graduates/ freshmen	Graduates/ acceptances	Graduates/ applicants	Freshmen/ applicants
1	2	3	4	5	6	7
1924–25			77.64			
1925–26			77.27			
1926–27	62.53	95.00	74.71	70.98	44.39	59.41
1927–28	57.45	95.42	76.16	72.67	41.75	54.81
1928–29	54.74	92.38	78.63	72.64	39.77	50.57
1929–30	51.01	91.76	75.92	69.66	35.53	46.80
1930–31			78.08			
1931–32			81.61			
1932–33	59.97	87.35	80.70	70.49	42.27	52.38
1933–34	62.49	85.21	83.05	70.77	44.22	53.25
1934–35	57.93	87.52	80.51	70.46	40.82	50.70
1935–36	54.11	88.94	83.26	74.05	40.07	48.13
1936–37	52.82	93.43	85.10	79.51	42.00	49.35
1937–38	52.51	92.24	89.23	82.30	43.22	48.43
1938–39	51.36	94.42	87.65	82.77	42.51	48.50
1939–40	52.74	95.38	88.68	84.58	44.61	50.30
1940–41	53.47	93.93	82.05	77.06	41.20	50.22
1941–42	57.48	91.49	*	*	*	52.58
1942–43	48.85	94.23	91.68	86.39	42.20	46.03
1943–44			*			
1944–45			85.10			
1945–46			82.18			
1946–47			83.92			
1947–48	34.21	99.62	93.53	93.18	31.87	34.08
1948–49	28.76	95.91	90.94	87.21	25.08	27.58
1949–50	29.29	98.49	94.84	93.41	26.36	28.85
1950–51	32.63	99.67	94.96	94.64	30.89	32.52
1951–52	38.49	98.22	93.25	91.59	35.26	37.81
1952–53	46.60	97.16	91.27	88.68	41.32	45.27
1953–54	53.09	97.31	91.33	88.87	47.18	51.66
1954–55	54.27	97.31	90.32	87.90	47.70	52.81
1955–56	53.57	97.48	92.92	90.58	48.53	52.22
1956–57	51.91	97.39	93.32	90.89	47.18	50.56
1957–58	52.80	96.89	92.63	89.75	47.39	51.16
1958–59	55.34	97.44	92.53	90.16	49.96	53.92

* Omitted because the relationship is distorted as a result of the accelerated programs followed by Medical Colleges during World War II.

On the other hand, however, the curve for applicants probably followed at least roughly that for freshmen during the period 1942–43 through 1947–48. This statement is based on the parallelism shown between the two curves during the known years after the early uncertainty noted in the preceding paragraph, and on the very large percentages existing for freshmen during the period just mentioned. The percentage for freshmen in 1943–44 was higher than that for applicants in both 1942–43 and 1947–48, and even in 1944–45 and 1945–46 the former was relatively quite high.

The gaps in Chart 1 between the curve for applicants, on the one hand, and those for acceptances and freshmen on the other, are quite large as compared with the gaps among acceptances, freshmen, and graduates; yet the curve for applicants reveals a considerable parallelism to the other three, along with a tendency toward convergence in the later years. The fluctuations for applicants are somewhat more violent than are those for the other three groups, but this is to be expected in view of the rather direct and close dependence of the latter groups upon the capacity of the medical colleges, and in view of the possibility of at least an occasional or a temporary looser dependence thereon in case of applicants.

If the effects of World War II are discounted, it is clear that all four curves in Chart 1 represent declines in the percentages over the period covered by the data. In other words, since the middle 1920's ever-decreasing proportions of the men in the applicant base group have been found among the applicants, accepted students, freshmen, and graduates. Moreover, it is likely that this long-time downward trend will continue.

Wider and wider ranges of vocational opportunities in professional, technical, and scientific fields have opened up over the years and will open up in the future to men who possess a baccalaureate degree. As a consequence, decreasing proportions will have an interest in the practice of medicine. At the same time, also, the yearly crop of new baccalaureate men has been increasing far more rapidly than has the total population, so that smaller and smaller proportions of such men have needed to enter upon the study of medicine to maintain a constant or even a somewhat increasing physician-population ratio.

Column 6 of Table 2 shows the number of medical college graduates per one million total population. Excluding the data for the World War II years these ratios ranged between 35.4 and 42.0. During the last seven years shown, however, the ratios varied but little, ranging between 39.4 and 40.9. As long as these ratios remain constant, a continuation of the same level of supply of medical services is assured, as far as this depends upon the output of U.S. medical colleges.

THE SPORTING BASIS FOR APPLICANTS

According to column 2 of Table 2, the proportion of the men's applicant base group who applied for admission to medical colleges dropped from 14.01 per cent in 1947–48 to 6.64 per cent in 1950–51. Subsequently, this ratio rose, but it recovered only a small part of this loss, never returning to its earlier high level, and the decline which it resumed in 1956–57 has continued since that time. According to column 4 of Table 1, the size of the applicant base group increased between 1947–48 and 1950–51, then underwent a reduction which continued through 1954–55, after which it rose again through 1958–59. A comparison of these data on the applicant base group in Table 1 with the percentages for applicants in column 2 of Table 2 reveals that in all instances but two during the period 1932–33 to 1958–59, whenever the *number* in the base group increased from one year to the next, the *proportion* of this group who applied for admission decreased, and whenever the former decreased the latter increased. Thus, it appears that the *number* of applicants was the result, not of some consistent relationship thereof to the number in the applicant base group (as shown by the proportion just referred to), but of some other factor which

was largely independent of the size of the base group.

It may be noted from column 2 of Table 3 that the low point in the proportion of applicants who were accepted by the medical colleges was 28.76 per cent in 1948–49. If, however, the post-World War II situation is disregarded, the general run of acceptances, both previously and later, was 50 per cent or slightly higher. The latter level had been of long standing if the first two or three years of the applicant-acceptance data are discounted for reasons already given, and this level was gradually regained following the low point of 1948–49. Thus, it appears that the percentages of applicants who were accepted, that is, the chances that applicants had of gaining admission to medical colleges, helped to determine the numbers who actually applied and therefore the proportions which they constituted of the applicant base group. More specifically, the 50–50 or slightly better chance of being accepted in any one year seems to be a critical ratio in the sense that, if it is not attained, the number of applicants is adjusted in the direction of re-establishing it. Moreover, since the number of acceptances depends upon the facilities available in our medical colleges, these facilities appear to constitute a demand factor which influences the extent of the supply, namely the number of applicants.

The *percentage* of acceptances depends, of course, upon the *number* of applicants and the *number* of acceptances. The latter, however, as just noted, is a function of the capacity of the medical colleges. In order, therefore, for the *percentage* of acceptances to remain constant from year to year, the *number* of applicants must always have about the same relationship to the number of acceptances. In other words, the number of applicants must be determined by the number of acceptances.

The chances that applicants for admission to medical colleges have of being accepted may be analyzed in another manner. Table 4, which relates to men and women combined, presents in column 12 data on the percentage of acceptances for all applicants (first-timers and repeaters combined) in any one year, which are similar to those already noted for men only. Column 13 shows only slightly higher proportions of acceptances among first-timers alone, but column 14 reveals considerably lower proportions among those who reapplied one year after a first rejection. Column 16, however, indicates that not more than 60 per cent of those who were rejected have reapplied in recent years. A combination of the data for first-timers and repeaters who stemmed from a given year's first-time applicants as presented in column 11, shows that about two-thirds of the first-time applicants in any year were accepted either in that year or in the following one. Thus, in recent years applicants have had about two chances in three of ultimately being accepted. These proportions, of course, include only those rejected applicants who applied a second time; we do not know what would have happened to the remainder who were rejected initially if they had reapplied.

The data in columns 11 to 14 inclusive in Table 4, all of which relate to percentages of acceptances, show a remarkable stability after 1952–53, that is, after the veteran bulge had been passed. Thus, these data seem to reflect something of the minimum chances for success that potential applicants, as a group, for admission to medical colleges expect to have if they are actually to make application. When these chances were greatly reduced in the late 1940's (see column 2 of Table 3), the number of applicants was rather quickly adjusted so as to return to what is apparently regarded as a sporting basis. The fact that, according to column 16 of Table 4, between 36 and 48 per cent of all applicants who were rejected on their first attempt did not make a second one is further though indirect evidence that, generally speaking, there must be at least a minimum chance for successful application. Moreover, since, with the chances being what they are, many applicants do not reapply after a first rejection, then by the same token, with greatly reduced chances

TABLE 4

Data on Applicants for Admission to Medical Colleges, Acceptances, and Rejections, Broken Down by First-Time Applicants, and Repeaters from the Preceding Year; for Men and Women Combined, 1950–51 to 1958–59

Year	Applicants in given year			Acceptances in given year			Repeaters shown for yr. of 1st application		Total of 1st timer and repeater acceptances among given yr's. 1st-time applicants		Per cent of applicants accepted among:			Rejected first-time applicants in given year	
	Total number	Repeaters from preceding year	First-timers (2–3)	Total number	Repeaters from preceding year	First-timers (5–6)	Applicants (Col. 3, 1 yr. later)	Acceptances (Col. 6, 1 yr. later)	Number (7+9)	Per cent (10/4)	All applicants in given yr. (5/2)	1st-timers in 1st yr. of application (7/4)	Repeaters in 2d yr. of application (9/8)	Total number (4–7)	Per cent reapplying next yr. (8/15)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1950–51	22,280			7,254			5,989	1,824			32.6				
1951–52	19,920	5,989	13,931	7,663	1,824	5,839	5,215	2,006	7,845	56.3	38.5	41.9	38.5	8,153	64.0
1952–53	16,763	5,215	11,548	7,778	2,006	5,772	3,409	1,371	7,143	61.9	46.4	50.0	40.2	5,776	59.0
1953–54	14,678	3,409	11,269	7,756	1,371	6,385	2,643	998	7,383	65.5	52.8	56.7	37.8	4,884	54.1
1954–55	14,538	2,643	11,895	7,878	998	6,780	2,820	1,116	7,896	66.4	54.2	57.0	39.6	5,115	55.1
1955–56	14,937	2,820	12,117	7,696	1,116	6,853	3,168	1,230	8,083	66.7	53.4	56.6	38.8	5,264	60.2
1956–57	15,917	3,168	12,749	8,263	1,230	7,033	2,995	1,114	8,147	63.9	51.9	55.2	37.2	5,716	52.4
1957–58	15,791	2,995	12,796	8,302	1,114	7,188					52.2	56.2		5,608	
1958–59	15,170			8,367							55.2				

Source: "The Study of Applicants," *The Journal of Medical Education* for the years involved.

for acceptance on the first application, many individuals might not feel it worth while to make even the initial attempt. This is apparently what happened in the early 1950's.

SURVIVAL RATIOS FOR MALE MEDICAL STUDENTS

Returning now to Table 3 we may note that it shows the survival ratios among male students who are interested in preparing for medicine, making use of four different stages of progress: application for admission, acceptance for instruction, entrance upon freshman work, and graduation with the M.D. degree. Column 3, which shows the percentage that freshmen were of acceptances, reveals in more exact terms the general fact already noted in Table 1 that during the depression years there were greater excesses of acceptances over freshmen than there were earlier or later and that during the period of the veteran bulge the excesses were unusually small. Column 4 of Table 3 indicates a substantial increase since the earlier years in the survival of freshmen to graduation. Both columns 3 and 4, however, show that in recent years the percentages which they present have become rather highly stabilized.

The last three columns of Table 3 present simply combinations of two or all of the ratios shown in the earlier columns. Column 7 is of special interest, however, in view of the role which the capacity of the medical colleges has already been noted to play in determining the number of applicants. The ratios in this column are better than those in column 2 as indicators of this capacity, since the latter do not reflect the differential shrinkages from acceptance to entrance which the medical colleges apparently expected and which actually occurred at different times, as already noted. Column 7 shows not only the effects of the veteran bulge but also the resulting movement away from the large excess of applicants back to a more normal situation. Outside of this period and of the first two years of data, the column represents a strong tendency for the ratio of freshmen to applicants to vary within only rather narrow limits, namely, between about 47 and 54 per cent, with a trend toward a figure slightly above rather than below 50 per cent in recent years. These statistics mean that the applicants have run from 1.85 to 2.13 times the freshmen, with a recent trend toward a factor of 2 or slightly less.

Since, according to column 2 of Table 3, the ratio of acceptances to applicants recently has also been rather stable, the number of applicants appears to be related to the number of acceptances as well as to the number of freshmen. Thus, all four of the variables for men, namely, applicants, acceptances, freshmen, and graduates, now seem to be closely interrelated, so that if any one of them can be projected into the future, the resulting data could be used for projections of all of the others.

RATIOS OF MALE TO TOTAL STUDENTS

The observation just made, however, relates to data for male students only, and it is desirable to make projections which include both sexes, even though the women constitute only a small proportion of the total. The data needed to relate male to total students are presented in Table 5, columns 2 through 5 indicating the proportions which the men constituted of the total of men and women combined in each of the four categories. The data for graduates again relate not to the given year but to the fourth later year. Since data on freshmen for men and women separately are not available, each percentage in column 4 was estimated from those in columns 2, 3, and 5 for the same year. The resulting estimates were then applied to column 11 of Table 1 to obtain the data in column 7 of that same table.

If the effects of World War II are ignored, each of the columns 2 through 5 of Table 5 reflects a remarkable constancy, although in general all of them reveal a slightly lower level during the last few years than in the earlier ones. The difference over about a 25-year period, however, is one of only 1 to 2 per cent, and none of the columns shows a

tendency toward a decrease during recent years. These facts suggest the possibility of estimating the total numbers (men and women combined) to be expected in future years in each of the categories from a projection of the corresponding data for men only. This procedure was used in deriving certain of the data in Table 6.

THE METHOD OF PROJECTION

Since the number of graduates of our medical colleges represents the end-point in their production, this measure is probably the most stable index of their capacity. Moreover, as already noted, differential shrinkages in acceptances have been assumed and actually have occurred at various times in the past, and the rate of survival of students between entrance as freshmen and graduation as M.D.'s has also undergone changes. For these reasons the number of graduates of the medical colleges was used as a measure of the capacity of these institutions, and this variable was the first to be

TABLE 5

PERCENTAGES WHICH MEN MEDICAL COLLEGE APPLICANTS, ACCEPTANCES, FRESHMEN, AND GRADUATES WERE OF THE TOTAL FOR MEN AND WOMEN COMBINED; 1924–25 TO 1958–59

	PERCENTAGE MEN WERE OF TOTAL (MEN AND WOMEN COMBINED) FOR:			
YEAR	Applicants	Acceptances	Freshmen*	Graduates†
1	2	3	4	5
1924–25			95.1	95.14
1925–26			95.2	95.19
1926–27	95.85		95.7	95.53
1927–28	95.88		95.7	95.42
1928–29	95.73		95.8	95.79
1929–30	96.48	95.52	95.5	95.63
1930–31			95.7	95.81
1931–32			95.8	95.94
1932–33	95.11		95.2	95.25
1933–34	95.82	95.83	95.8	95.57
1934–35	95.02	94.82	95.0	95.44
1935–36	94.59	94.51	94.7	94.89
1936–37	94.59	94.23	94.4	95.04
1937–38	94.68	94.68	94.7	94.69
1938–39	94.71	94.83	94.7	94.60
1939–40	94.64	94.83	95.0	95.39
1940–41	95.06	95.21	95.0	90.44
1941–42	94.67	95.24	95.6	97.46
1942–43	94.23	94.57	94.8	95.85
1943–44			94.5	94.65
1944–45			92.8	92.93
1945–46			90.0	87.99
1946–47			90.0	89.29
1947–48	94.42	93.40	93.4	92.37
1948–49	94.22	94.21	94.2	94.23
1949–50	94.31	94.41	94.4	94.56
1950–51	94.47	94.69	94.7	94.75
1951–52	94.43	94.49	94.6	95.06
1952–53	93.91	94.30	94.5	95.03
1953–54	93.38	93.81	94.1	95.14
1954–55	93.82	93.96	94.2	94.83
1955–56	93.29	93.68	94.0	95.00
1956–57	93.21	93.21	93.6	95.01
1957–58	93.73	94.13	94.3	95.00
1958–59	93.82	94.14	94.4	95.01

* Estimated; see text for method of derivation.

† These data relate to the fourth year later than the one shown in column 1.

TABLE 6

PROJECTIONS OF BASIC DATA CONCERNING STUDENTS IN ALL MEDICAL COLLEGES AND SCHOOLS OF BASIC MEDICAL SCIENCES IN THE UNITED STATES; FOR MEN SEPARATELY AND FOR MEN AND WOMEN COMBINED; 1959–60 TO 1974–75*

			DATA FOR MEN ONLY					MEDICAL COLLEGE DATA FOR MEN AND WOMEN COMBINED			
					Medical college						
YEAR	21-yr.-olds	First-level degrees	Applicant base group	Applicants	Acceptances	Freshmen	Grads. 4th yr. later	Applicants	Acceptances	Freshmen	Grads. 4th yr. later
1	2	3	4	5	6	7	8	9	10	11	12
1959–60	1,162,250	264,000	258,750	14,807	7,924	7,708	7,104	15,836	8,448	8,191	7,478
1960–61	1,215,340	253,200	261,300	14,845	7,944	7,728	7,123	15,877	8,469	8,213	7,498
1961–62	1,235,010	255,500	253,775	14,878	7,962	7,745	7,138	15,912	8,488	8,231	7,514
1962–63	1,353,260	260,000	256,625	15,051	8,054	7,835	7,221	16,097	8,586	8,326	7,601
1963–64	1,496,320	276,800	264,200	15,224	8,147	7,925	7,304	16,282	8,686	8,422	7,688
1964–65	1,465,190	274,700	276,275	15,395	8,238	8,014	7,386	16,465	8,783	8,516	7,775
1965–66	1,428,010	271,300	273,850	15,568	8,331	8,104	7,469	16,650	8,882	8,612	7,862
1966–67	1,592,520	300,000	278,475	15,741	8,423	8,194	7,552	16,835	8,980	8,708	7,949
1967–68	1,828,750	325,000	306,250	15,910	8,514	8,282	7,633	17,016	9,077	8,801	8,035
1968–69	1,802,250	355,500	332,625	16,083	8,606	8,372	7,716	17,201	9,175	8,897	8,122
1969–70	1,802,340	360,000	356,625	16,256	8,699	8,462	7,799	17,386	9,274	8,993	8,209
1970–71	1,708,750	345,000	356,250	16,426	8,790	8,551	7,881	17,568	9,371	9,087	8,296
1971–72	1,785,580	364,000	349,750	16,599	8,883	8,641	7,964	17,753	9,470	9,183	8,383
1972–73	1,877,270	386,500	369,625	16,772	8,975	8,731	8,047	17,938	9,568	9,278	8,470
1973–74	1,919,800	399,000	389,625	16,943	9,067	8,820	8,129	18,121	9,666	9,373	8,557
1974–75	1,947,220	400,000	399,250	17,116	9,159	8,910	8,212	18,306	9,764	9,469	8,644

* For a description of the derivation of these data see the text.

projected into the future. The other variables were then projected on the basis of assumed relationships of freshmen to graduates and of acceptances and applicants to freshmen.

The projection of the number of medical college graduates, which dealt with men and women combined, involved application of the method of "least squares" to data on the total graduates of all such institutions in the United States (see column 12 of Table 1), during each year of the period 1924–25 through 1963–64. The estimates for these years after 1958–59 were based on the freshman enrollments during the years 1956–57 and 1957–58, the additions made in the following year at the University of Illinois, University of Miami, and University of Wisconsin, and the admissions planned at the University of Kentucky in 1959–60 and 1960–61. The least-squares method, then, provided the projection of the number of graduates during each year from 1964–65 through 1977–78, which data are presented in column 12 of Table 6, along with those for the earlier future years. These data, which relate not to the year shown in column 1 but to the fourth later year, represent an increase of approximately 87 graduates per year during the last 13 years used. This number, of course, was the average annual increase during the 40-year period to which the method of least squares was applied.

According to the data in column 5 of Table 5, the men graduates during the past six years averaged 95.0 per cent of the total graduates. The application of this percentage to the data in column 12 of Table 6 yielded the number of men graduates presented in column 8 of the latter table.

After an examination of the data in columns 4, 3 and 7 of Table 3, it was decided to use the average percentage for the last six years in each case as a basis for the projections in columns 7, 6 and 5, respectively, of Table 6. By the reciprocals of these averages, the freshman men were assumed in the future to constitute 108.5 per cent of the men graduates (who are shown in column 8 of Table 6), and the men acceptances and applicants were assumed to constitute 102.8 per cent and 192.1 per cent, respectively, of the resulting numbers of freshman men. The application of these proportions yielded the data in columns 7, 6 and 5 of Table 6, respectively.

Finally, after examining the data in columns 4, 3, and 2 of Table 5, it was decided to use the average percentage for the last six years in each case as the basis for the projections in columns 11, 10, and 9, respectively, of Table 6. According to these averages the freshman men were assumed in the future to constitute 94.1 per cent of the total (men and women combined) freshmen, and the men acceptances and applicants were assumed to constitute 93.8 and 93.5 per cent of the totals for both sexes in these two categories, respectively. The application of the reciprocals of these proportions yielded the projections just referred to in Table 6.

The future numbers of 21-year-old men shown in column 2 of Table 6 were calculated by starting with the data on (*a*) the number at each age according to the 1950 Census and (*b*) the corrected number of births in each year, for the ages and years involved, "aging" each group to the 21st year, and allowing for estimated changes due to migration up to that time. The future numbers of first-level degrees for men in column 3 of Table 6 were projected on the basis of past data concerning the relationship of degrees granted to the number of 21-year-olds, allowing for the trends in the veteran enrollments in each of the four undergraduate classes as shown by data for all higher institutions in Illinois during recent years through 1958–59. The method of deriving data on the applicant base group as presented in column 4 has already been explained.

It may now be noted that Table 6 represents a projection into the future of all the data in Table 1. Thus, every column in the former table bears exactly the same caption as the column with the corresponding number in the latter table.

THE PROJECTED SUPPLY OF MEDICAL STUDENTS

Before examining Table 6 it should be noted that no projection which provides year-by-year data can indicate their annual fluctuations. A projection assumes regular progress along an assumed trend line which is based on past data, even though the actual situation in individual years was somewhat above or below that line. That these past variations will continue in the future is certain, but they cannot be anticipated. These departures from the projections, however, do not necessarily invalidate them, because basically they indicate only the prospective general trend, which may be followed just as faithfully in the future as it has been in the past.

According to column 12 of Table 6 the medical colleges of the United States under present prospects are expected to graduate a total of 8,644 M.D.'s from the freshmen who enter in 1974–75. This number will represent the survivors from 9,469 freshmen, who in turn will come from a total of 9,764 acceptances out of a total of 18,306 applicants (columns 11, 10, and 9, respectively). Column 9 reveals that the number of applicants is expected to increase gradually to the latter figure from a total of 15,836 in 1959–60. The actual number for any one year during this period, of course, may vary considerably from the projection shown in the Table even though the indicated general trend is followed. This statement applies also to the other columns in the Table, although the variations in these cases are likely to be considerably smaller than those for applicants.

Certain of the data in Table 6 were used in preparing Table 7, which represents an extension of Table 2 into the future, the last two tables having identical column captions. Columns 2 through 5 of Table 7 reveal in

TABLE 7

THE PERCENTAGE WHICH MEN MEDICAL COLLEGE APPLICANTS, ACCEPTANCES, FRESHMEN, AND GRADUATES DURING THE YEARS 1959–60 TO 1974–75 ARE EXPECTED TO BE OF THE MALE APPLICANT BASE GROUP; ALSO THE EXPECTED NUMBER OF TOTAL (MEN PLUS WOMEN) GRADUATES PER 1,000,000 TOTAL U.S. POPULATION (DERIVED FROM BASIC DATA IN TABLE 6)

	Percentage for				Number of graduates per 1,000,000 population*
Year	Applicants	Acceptances	Freshmen	Graduates*	
1	2	3	4	5	6
1959–60	5.72	3.06	2.98	2.75	39.5†
1960–61	5.68	3.04	2.96	2.73	38.9†
1961–62	5.86	3.14	3.05	2.81	38.4
1962–63	5.86	3.14	3.05	2.81	38.1†
1963–64	5.76	3.08	3.00	2.76	37.9†
1964–65	5.57	2.98	2.90	2.67	37.6†
1965–66	5.68	3.04	2.96	2.73	36.5†
1966–67	5.65	3.02	2.94	2.71	37.2
1967–68	5.20	2.78	2.70	2.49	36.8†
1968–69	4.84	2.59	2.52	2.32	36.5†
1969–70	4.56	2.44	2.37	2.19	36.2†
1970–71	4.61	2.47	2.40	2.21	35.9†
1971–72	4.75	2.54	2.47	2.28	35.6
1972–73	4.54	2.43	2.36	2.18	35.3†
1973–74	4.35	2.33	2.26	2.09	34.9†
1974–75	4.29	2.29	2.23	2.06	34.6†

* These data relate to the fourth year later than the one shown in column 1.

† Based on population data which are interpolations of projections for 1960, 1965, 1970, 1975, and 1980.

general that the declines in the ratios which began in the middle 1950's according to the earlier table (2) may be expected to continue in the future, though with some fluctuations. In view of the method of projection used, all four columns, of course, reveal the same trend. The low point in 1960–61 is expected to be followed by a small rise, after which a further decline is in prospect, broken by small temporary increases in 1965–66 and in 1970–71 and 1971–72. The percentage which the men applicants will represent of the applicant base group, for example, is expected to decline from 5.72 per cent in 1959–60 to 4.29 per cent in 1974–75, while the proportion for graduates will drop from 2.75 per cent to 2.06 per cent during the same period.

Column 6 of Table 7 reveals a reduction also in the number of medical college graduates expected per one million total population. This decline, which began during the last two years shown in Table 2 (column 6), is expected to continue until the end of the period covered, except for small rises during two of these years. Even the ratio for the last future year, however, is only slightly below that for the first year included in Table 2. Nevertheless, these data portend some reduction below present levels, in the ratio of the supply of physicians which is provided by American colleges of medicine, to the total population. Such a decline would mean a lowering of the nation's future physician-population ratio unless the deficiency were made up from other sources.

AN ALTERNATIVE METHOD OF PROJECTION

In conclusion it may be noted that a projection of applicants could be attempted by assuming, on the basis of past trends, a more and more gradually declining curve for the percentage that applicants will constitute each year of the applicant base group. (See the curve for applicants in Chart 1.) The number of applicants then would be regarded as simply a function of this base group, and as being, in effect, independent of the capacity of our medical colleges. The resulting projected percentages (applicants/base group), however, would be much higher than those shown in Table 7, and they would represent a much smoother curve (with only a continuous decline) than is implied in the description already given of the latter projection. Thus the numbers of applicants projected on the basis of the base group would be much larger than those shown in Table 6. In view of the data presented in this report, however, it is probably not sound to assume that the number of applicants will be independent of the nation's expected capacity for undergraduate medical education, and, in light of all of the evidence, the projection of applicants shown in Table 6 appears to be the more defensible one.

The Eighth National Intern Matching Program

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This will be the 8th annual report of the National Intern Matching Program. Some, but not all, of the basic data that have characterized previous reports are being continued. Some data that have not been published for several years are being brought up to date, and other data are being included for the first time. The data that may be missed are those which have shown the distribution of matched internships according to nature of hospital affiliation, amount of stipend, and number of interns sought and matched. A review of last year's report (Tables 5 through 16) (2) will reveal that these data were handled in such a way as to show the changes that had occurred between 1953 and 1958. It is now planned to repeat the presentation of these tables only as further changes may justify—perhaps once every 2 or 3 years.

Table 1 reviews the numbers and percentages of U.S. graduates and approved hospitals and internship programs participating in NIMP since its first report in 1952. While the initial participations were all over 90 per cent, it was not until 1955 that the present high levels were reached. The percentage of participation of U.S. graduates is lower than that for hospitals and programs for a variety of reasons. A few students deliberately stay out of the program, some to take an internship in a hospital awaiting approval and therefore one that is not yet eligible for participation. A very few do not take an internship or defer internship because they go directly into research or graduate study. The principal reason for nonparticipation is a decision to intern in a nonparticipating hospital. This situation applies particularly to Tennessee, where the University of Tennessee graduates about three-quarters of its seniors at times of the year that do not fit into the NIMP timetable. Thus, those hospitals, most of them in Tennessee, that wish to accept students who graduate at odd times, find it necessary not to participate.

Table 2 continues the tabulation of general data that have characterized previous reports. As predicted in last year's report (2), owing to the decision of NIMP to require Educational Council for Foreign Medical Graduates screening, there was a sharp drop in foreign graduate participants (376 to 4). Because of this, a considerable drop in the number of graduates going unmatched was also predicted. Table 2 shows that this proved to be the case. Beginning with the 1960–61 program, the number of foreign participants will again increase, and, as a consequence, because of ECFMG screening, it is predicted that the percentage of foreign graduates matched will show a very substantial increase over previous years.

Tables 3 and 4 show the type, number, and percentage of internships offered and filled through NIMP for 1952, 1954, and 1959. The number of rotating general internships offered has increased, but the number and per cent matched have dropped. The number of straight internships offered and the number matched have increased, and as a consequence the per cent matched has shown a sharp increase—59 to 75 per cent. The category "other internships" includes miscellaneous types of mixed internships with varying kinds of emphasis. Consequently, they cannot be classified as either rotating or straight and must be dealt with separately. These kinds of programs and internships are falling off in number but have shown a slight gain as far as their per cent of matches is concerned. The recent drop in the

TABLE 1

The Number and Percentage Participation of U.S. Graduates and Approved Hospitals and Programs, 1952–1959

	1952	1953	1954	1955	1956	1957	1958	1959
Total U.S. graduates participating	5617	5947	6258	6533	6430	6498	6576	6562
Total U.S. graduates	6153	6418	6672	6870	6719	6689	6862	6850
Per cent U.S. graduates participating in NIMP	91.3	92.7	93.8	95.1	95.7	97.1	95.8	95.8
Hospitals participating in NIMP	795	808	820	814	821	822	819	818
Total approved hospitals	826	833	836	826	834	833	835	834
Per cent hospitals participating in NIMP	96.2	97	98.1	98.5	98.4	98.7	98.1	98.1
Total intern programs offered	1068	1102	1032	1056	1063	1052	1062	1069
Total approved intern programs	1102	1130	1048	1068	1076	1063	1078	1085
Per cent programs participating in NIMP	96.9	97.5	98.5	98.9	98.8	99	98.5	98.5

TABLE 2

General Results, 1952–1959

Year	Hospitals participating	Intern programs offered	Total positions offered	Total positions filled	Per cent filled	Number unfilled positions	Students participating	Students unmatched
1952	795	1068	10414	5564	53	4850	5681	117
1953	808	1102	10971	5744	52	5227	6033	289
1954	820	1032	10729	6051	56	4678	6412	361
1955	814	1056	11075	6379	58	4696	6713	334
1956	821	1063	11459	6588	57	4871	6821	233
1957	822	1052	11804	6539	55	5265	6923	384
1958	819	1062	11958	6734	56*	5224	7131†	397
1959	818	1069	12250	6478	53	5772	6729	251

* Incorrectly carried in the Seventh Annual Report as 52 per cent.

† Incorrectly carried in the Seventh Annual Report as 7031.

TABLE 3

Types and Number of Internships Offered and Filled through NIMP since 1952

	Rotating general internships			Straight internships			Other internships			All internships		
Programs:	1952 #1	1954 #3	1959 #8	1952 #1	1954 #3	1959 #8	1952 #1	1954 #3	1959 #8	1952 #1	1954 #3	1959 #8
Number offered	8596	9343	10453	1098	1025	1398	720	361	399	10414	10729	12250
Number matched	4479	5092	5141	656	728	1060	429	231	277	5564	6051	6478
Per cent Matched	52.1	54.5	49.2	59.7	71	75.8	59.6	64	69.4	53.4	56.4	52.9

TABLE 4

The Type and Number of Straight Internships Offered and Filled through NIMP since 1952

	Medicine			Surgery			Pediatrics			Ob.-Gyn.			Pathology		
Programs:	1952 #1	1954 #3	1959 #8	1952 #1	1954 #3	1959 #8	1952 #1	1954 #3	1959 #8	1952 #1	1954 #3	1959 #8	1952 #1	1954 #3	1959 #8
Number offered	503	546	674	364	358	425	121	113	209	51	8	27	59		63
Number matched	359	434	586	202	231	310	69	62	121	11	1	5	15		38
Per cent matched	71.4	79.5	86.9	55.5	64.5	72.9	57	54.9	57.9	21.6	12.5	18.5	25.4		60.3

per cent matched for all internships is a reflection of the fact that the number of internships being offered is proportionately growing faster than the number of available graduates. Of the straight internships, except for those in obstetrics and gynecology, there has been a slight increase in number and also an increase in the per cent matched. For each of the 3 years noted in Table 3, the total number of straight internships offered

TABLE 5

APPLICATION PER STUDENT

Year	No. students	No. applications	No. per student
1952	5681	21728	3.8
1953	6033	19416	3.2
1954	6412	21579	3.4
1955	6713	25617	3.8
1956	6821	29474	4.3
1957	6923	30434	4.4
1958	7131*	32090	4.5†
1959	6729	29416	4.4

* Incorrectly carried in the Seventh Annual Report as 7031.

† Incorrectly carried in the Seventh Annual Report as 4.6.

TABLE 6

PERCENTAGE OF STUDENTS MATCHED BY ORDER OF CHOICE

Year	Per cent first choice	Per cent second choice	Per cent third choice	Per cent fourth choice or lower
1952	84	10	3	3
1953	85	10	3	2
1954	82	11	4	3
1955	76	14	5	5
1956	74	15	6	5
1957	76	13	6	5
1958	74	14	6	6
1959	77	12	5	6

as a proportion of all internships offered has retained approximately the same relative position—10.5, 9.5 and 11.4 per cent, respectively.[1] However, out of the total number of all internships matched, the share falling to the straight internship has shown a modest increase—11.7, 12.0, and 16.3 per cent, respectively.

Tables 5, 6, and 7 show the continued leveling off of the number of internship applications per student, the percentage of students matched by order of choice, and the hospitals' ranking of students with whom they were matched. In past reports it has been assumed that the downward trend (1952 to 1958, particularly) in the percentage of students being matched for first choice was an indication that students were adding, as first choice, institutions in which they felt their chances for acceptance were open to question, but also in which they would like to intern if they possibly could. Students can feel free to make such "tries," because in such instances they are not hurting their chances for their second- and third-choice hospitals—hospitals which otherwise they would list in first and second places.

Table 8 reports a more definite analysis of what happens to students who make few choices compared with those who make many. Students who make fewer applications tend to be matched with hospitals that fall the shortest of filling their quotas. As the number of applications increase, the chance of being matched with a hospital that fills or comes close to filling its quota is increased.

While last year's report (2) dealt in detail with the background, history, mechanics, and timetable of the NIMP, it did not indicate the manner in which compliance with the Program's agreements was administered. After 8 years' experience, a discussion of this aspect of the Matching Program is indicated.

In the first place, it must be remembered that, for both hospitals and graduates, the decision to join the program is voluntary. A hospital or student, once this decision has been made, applies for, signs, and returns the appropriate agreement. The Board of Directors of NIMP[2] establishes the terms of these agreements, must authorize any changes therein, must decide questions relative to their interpretation, and, finally,

[1] These calculations are made from but are not shown in Table 3.

[2] The Board of Directors consists of three representatives each from the American Medical Association and the Association of American Medical Colleges, two from the American Hospital Association, one each from the Catholic and Protestant Hospital Associations, one from the Student American Medical Association and another student representing the national medical student body at large.

must approve any action taken in connection with their infraction.

The hospital and student agreements for the 1960–61 program are reproduced below:

HOSPITAL AGREEMENT

On behalf of the hospital named above, I agree to abide by the regulations of the National Intern Matching Program for appointment of interns for first year internships for 1960–1961 (starting service from April 1 through December 31, 1960.)

In particular, it is understood that this hospital is agreeing to:

1. Offer internship appointment to all applicants matched with this hospital by the matching program, the matched students being the highest ranked students on this hospital's confidential ranking form who wish to intern here more than at any other hospital available to them.

2. Restrict internship appointment for United States and Canadian applicants to participants designated for this hospital through the matching program until after notification of the selections made through the matching program.

3. Make or require no commitments or contracts with United States or Canadian applicants prior to the notification of the selections made through the matching program.

4. Abide by the official schedule including accepting no applications from participants in the matching plan after January 25, 1960; rating applicants and returning rating form by January 30, 1960, offering formal appointment promptly to individuals matched by the plan with this hospital, and no later than March 31, 1960.

5. Not accept an intern who was matched elsewhere and subsequently not released.[3]

6. Pay a service fee of $4.00 for each intern matched through the plan.

We understand further that although we may freely discuss any matter we choose with the student, no participating hospital has the right, under the plan, to demand or to require that the student state how he will rank this hospital on his confidential rating blank. We also understand that the student has no right to request or to demand that this hospital inform him how it plans to rate him.

[3] This condition was made a part of the agreement beginning with the Eighth Matching Program.

TABLE 7

HOSPITALS' RANKING OF STUDENTS WITH WHOM THEY WERE MATCHED

Year	Per cent matched from Rank Group I*	Per cent matched from Rank Group II	Per cent matched from Rank Group III	Per cent other	Total
1956	61	24	11	4	100
1957	71	19	7	3	100
1958	67	22	8	3	100
1959	69	21	8	2	100

* If hospital quota is 10, first ten men on list form Rank Group I, numbers 11–20 Rank Group II, etc.

TABLE 8

COMPARISON OF THE NUMBER OF APPLICATIONS MADE WITH THE PERCENTAGE OF POSITIONS FILLED IN THE HOSPITALS WHERE APPLICANTS WERE MATCHED

Number of applications made:	1	2	3	4	5	6	7	8	9 and more
Number of graduates making corresponding number of applications	885	875	1,219	1,075	766	526	301	245	584
Percentage of intern positions filled where applicants were matched*	73	73	72	75	77	79	82	83	84

* The percentages of intern positions filled in the hospitals involved were computed by dividing the total intern positions filled by the number of positions offered.

Furthermore, any statement or other expression concerning how this hospital intends to rank an applicant or how that applicant intends to rank this hospital, which may be made during the free discussion between the hospital and the student, is subject to change based on further considerations. We understand that we, as well as the student, have the right to change our minds at any time prior to the submission of the official confidential rating blanks.

The confidential rating blank submitted by this hospital and confirmed, is to be the sole determinant of the order of our preference among our applicants.

STUDENT AGREEMENT

I agree to participate in and abide by the results of the matching plan for internship appointment. In particular, I understand that I am agreeing:

1. To apply for internship appointment only to hospitals and the federal services registered in the matching plan until after the matching plan results are announced. I understand that an official directory listing the cooperating hospitals and federal services will be available in October, 1959.

2. To accept appointment to the hospital or federal service with which I am officially matched, that hospital being the highest one on my preference list having a place available for me. I understand that I cannot avoid accepting an internship to which I have been matched without a written release from the hospital concerned—also, that another hospital that is a member of NIMP cannot accept me as an intern unless I have this release.[4]

3. To abide by the official schedule, including ranking the internships for which I have applied and returning my confidential ranking form before February 1, 1960.

4. To send herewith a non-refundable fee of $2.00 to help cover the costs of participation in the matching plan.

It is my understanding that I am free, under the matching plan, to make personal contacts with any participating hospital in which I am interested and to apply to as many of these hospitals as I wish and to rank them according to my judgment.

I understand further that, although I may freely discuss any matter I choose with the hospital, no participating hospital has the right, under the matching plan, to demand or to require that I state how I shall rank that hospital on my confidential rating blank. I understand also that I have no right to request or to demand that that hospital inform me how it plans to rate me.

Furthermore, any statement or other expression concerning how I intend to rank a hospital or how that hospital intends to rank me, which may be made during the free discussion between the hospital and myself, is subject to change based on further considerations. I understand that both the hospital and I have the right to change our minds at any time prior to the submission of the official confidential rating blanks.

My confirmed confidential rating blank, giving my order of preference, is to be the sole determinant of the order of my preference among the internships for which I have applied.

I understand that resignation from the Matching Program can be made only with the approval of my dean, and that no resignations can be accepted after November 14, 1959.

I agree to conduct myself in conformity with the high ethical standards expected of members of the medical profession.

Withdrawal from the program is optional for both hospitals and students, provided the timing and manner of withdrawal comply with the timetable and provisions of the signed agreements. In the case of student withdrawal, the concurrence of the respective dean is required. Within 2 weeks after the matching results have been announced, students and hospitals should recognize their matchings by formal contract. The NIMP agreements with both student and hospital can be considered satisfied as soon as the intern begins service. These procedures tie in with the following statement which appears in *Essentials of an Approved Internship* of the Council on Medical Education and Hospitals of the American Medical Association:

Hospital-Intern Agreement.—A formal agreement in which mutual obligations are defined should be entered into between the hospital and the applicant at the time of his appointment. This agreement must be honorably fulfilled by both parties and should be terminated only by mutual consent. A breach of the agreement by either a hospital or an intern is not condoned by the Council. Whenever com-

[4] This sentence was made a part of the agreement beginning with the Eighth Matching Program.

plaint of such a breach is made, it is the policy of the Council to ask each of the parties involved to submit an explanatory statement. Such statements become a part of the physician's and the hospital's record and are made available on request to authorized agencies.

The few questions of irregularity that do occur, unless resolved early in their development, can become complicated and difficult. Therefore, once a hospital, student, or dean is aware of a question that can lead to possible infraction, experience has shown that the quicker such is made known to the NIMP office, the better. Most such situations are the result of failure to read the NIMP agreements carefully, lack of understanding, or inadequate communication. The NIMP office, communicating with the appropriate deans, students, and hospitals, has usually been able to assist with the resolution of these questions to the satisfaction of all concerned. Of course, reports of irregularity that are not supported by a statement of the pertinent facts and a willingness to be quoted do not lend themselves to investigation.

Any cases that go to the point of probable infraction are reviewed by the Executive Committee of the Board of Directors and later by the Board itself. In case of established infraction on the part of a hospital, the Board can determine that copies of the pertinent correspondence be filed with the Council on Medical Education and Hospitals of the AMA. If the infraction involves a student, the Board can determine that copies of the pertinent correspondence be filed with the Biographical Records Section of the AMA. The most common questions of infraction center around the acceptance of a student, without release, by a hospital other than the one to which he or she has been matched. Such instances involve the accepting hospitals as well as the students. As a consequence, when the correspondence pertinent to a proved case of such infraction is filed with the AMA, the names of both the hospital and the student will appear.

Fortunately, instances of the need for any such action have been very rare. In fact, considering the thousands of individuals who are involved in the entire NIMP enterprise—hospital administrators and staffs, students, deans, and faculty advisors—the incidence of any kind of difficulty is small indeed. Cooperation upon all sides has been the rule. This shows the principal force that is responsible for the smooth operation of NIMP is the spirit of fair play that originally made the program possible and that has since prevailed.

REFERENCES

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Oedipus, Cain and Abel, and the Geographic Full-Time System

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Many psychiatrists today are convinced that the modern study of psychiatric patients has led not only to a workable understanding of neurotic and psychotic problems but also to a more general understanding of human behavior. Two points in support of this thesis can be mentioned. One is that patients are not members of a separate species but rather are slightly variant examples of human beings. And, second, patients are those men and women and children who, because of their hope of a cure or a lessening of their distress, are more willing than others to reveal the truths of their secret lives and the essence of their humanity. Hence, the intensive and extensive studies of patients have led to a greater understanding of men and women in general.

From this it could follow that our understanding of patients as persons provides a greater understanding of those men and women who are medical students, interns, residents, and faculty members. The findings of psychiatry, then, may suggest some additional points of understanding of medical students and faculty members, and of the agencies and patterns which they create and use; or, put in the form of a question, we shall ask, in this essay, whether present-day psychiatry has something to contribute to our thinking about medical education and about the policies of departments in a medical school.

The title of the essay has three parts, apparently unrelated. The first item of the title indicates that the essay will refer to the set of feelings and impulses named in psychiatry after Oedipus Rex, and will refer to the impulses, usually unconscious, of associate professors, assistant professors, and instructors, to murder the professor, the director of the department, as Oedipus murdered his father. The Oedipus complex, as the readers of this *Journal* know, has two components—the son's wish to be rid of his father and the son's wish to marry his mother. In medical school circles, the evidence is overwhelming that all, from instructors to associate professors, consciously or unconsciously want to murder the father-director. If also they want to marry his wife, or his widow, we cannot be sure. Our evidence is incomplete. (And, of course, we must not mention that old devil sex in a medical essay.)

The second part of the title refers to the Cain and Abel problem in our medical faculties, in which associate professors, assistant professors, and instructors want to murder their brother faculty members as Cain murdered his brother Abel.

The third part of the title indicates that the essay will focus on the geographic full-time system, which many of us believe is one of the most important and productive patterns of medical school organization and structure. It can be defined as the system under which medical faculty members give their primary interest, time, and energy to their academic appointments, are paid by the school, are permitted also to participate to a limited extent in private practice, but are not permitted to have offices for private practice outside the medical school or university hospital geographic center.

The title, then, is an amalgam of medical

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college organizations; the Bible story of Cain and Abel; the great Greek drama of Oedipus; and the psychiatric finding that, hidden in the most mature and intelligent men and women, the members of a medical school faculty, are impulses similar to the violent and primitive behavior portrayed in great dramas and historical documents.

The Bible and Sophocles are included in the presentation. Inevitably, we now must include some poetry, or, rather, we now can refer to a comment attributed to the great American poet, Robert Frost. When he had reached a fairly mature age, Mr. Frost was asked whether he had come to some brief definition of "wisdom." His response was that he had tried many times to devise some simple phrase that for him would come close to defining the essence of wisdom. His final version, he said, was a paraphrase of a comment of many others throughout the ages, that true wisdom was the ability to act, when it was necessary, on the basis of incomplete information.

His principle of true wisdom is of the highest value in the everyday practice of medicine. It means that, even though we try earnestly to have a good solid foundation of scientific and experimentally verifiable data for all of our medical procedures and methods of treatment, we still not infrequently are faced with a situation in which our scientific information is incomplete, but in which we must act without hesitation and with a high degree of responsibility. In Mr. Frost's terms, our actions at such times must be based on incomplete information. In our teaching of the resident group we often emphasize the point that the practice of medicine involves a delicate balance between high scientific standards, with an emphasis on experimental and verifiable data, on predictability and accuracy, and the second fundamental requirement, the need for responsible medical action even when all the scientific facts are not yet available.

Similarly, in the field of ideas and principles, there must be two kinds of conclusions—one which is the result of research, of experimentation, and of statistical validation, and another kind which is incomplete but is probable and is worth using and trying. One must, in Mr. Frost's terms, have the courage to go forward on the basis of ideas which are incomplete but are the best we have.

Hence, this paper is presented as an essay, in first-person terms. It is not a report of a well designed and statistically validated research, but rather a discussion of ideas which are the precipitate of some 30 years of work as a psychiatrist plus a large variety of more casual observations, from the psychiatrist's point of view, of the patterns and persons in the field of medical education and administration.

The thesis of the essay can be phrased in this fashion: that, for certain specific psychologic reasons which we will discuss in a moment, the geographic full-time system has tremendous advantages over the pure full-time system in the organization of medical schools; and, further, that some specific ways of handling the geographic full-time system may add even more to its value.

The fundamental psychologic factors to which I refer are the following. A department of a medical school usually has one man as the director of the department. He is in a position of fairly great authority and responsibility. Usually, in addition, there are a number of associate professors, assistant professors, and instructors. As their careers develop, the instructors and the assistant and associate professors inevitably compete with each other, or at least want very strongly to compete with each other. In addition, these members of the faculty often have competitive impulses toward the director as well; and some of these competitive impulses can be extreme.

Surely we need no longer pretend that human relations are altogether sweetness and light and that all members of medical faculties are well-bred gentlemen. We know that for the most part their actual behavior is very acceptable indeed; but we know also that individuals of the greatest maturity and decency have a variety of unacceptable impulses, some conscious but most uncon-

scious. In the year 1960 it no longer is possible to think of human beings as being either all nice or all bad. Such a concept is possible only if one adheres to the old-fashioned and primitive notion of "good guys and bad guys," such as children must have in watching a Western program on television. One of the points of psychodynamic understanding is that all good guys, e.g., all members of the medical school faculty, have some bad-guy impulses.

It is a commonplace observation that the director of a department by virtue of his authority arouses a series or a variety of emotional responses on the part of many other members of the department faculty. Some of the staff come to be deeply dependent on the director's leadership and come to feel that their security is in good part based on their relationship with him as a fatherly person who will take care of them, foster their careers, and shield them from criticism.

In college departments one can observe a variety of relationships within the departments, some healthy and some unhealthy; and in some departments one can see the effects of the authoritative role of the director on the rest of the group. In some faculty members, one can see an undue passivity and submissiveness, in some one can see an undue competition with the authority figure, and in some one can see an undue competition with others for the favor of the one in authority. Moreover, all three of these reactions may occur in one man.

To make the point, we can use an analogy which may be more than an analogy. A small group in which one individual has a sharply structured and demarcated position of strength and leadership has a great similarity to a family group, a father and his children. Much of the emotional interplay characteristic of family life holds true also for other small groups. Many people respond in a group as they first learned to respond in childhood, in the family group. There is no doubt that the director of a department often is regarded as a kind of father-figure by the other members of the faculty, and that toward him they have responses of obedience, submission, loyalty, passivity, rebellion, defiance, competition, and hostility, as they might, or did, have to a father-figure in a family.

A medical school department head may have an authoritarian personality. If this be true, he will have some of the reactions directed toward him which go toward an authoritarian father in a family. Excessive dependence and excessive rebellion against authority often will occur in such a department. This is true, but, more important for the thesis of this paper, is the fact that in some departments the director is forced into the role of being an authoritarian person even though his personality may not be authoritarian in its fundamental structure. For example, if he is the head of a department in which the total income of the assistant professors is dependent on his leadership, if their promotion is largely dependent on his good will, if their careers are in good part dependent on the kind of letters of recommendation that he may write, he is in a position of very great authority indeed. Almost inevitably he will have directed toward him very strong feelings of dependence and passivity.

If, then, a member of the faculty is not able to rest easily with being in such a dependent and passive position, he will tend to react against the situation and perhaps against his own impulses to be dependent. If he regards a dependent role with another man as being a blow to his masculinity he may develop pseudomasculine reactions, e.g., may have serious and aggressive quarrels with the head of the department or in some other way emphasize his independence of the professor. In other instances he may not react directly to the head of the department but rather to the other members of the faculty. He may need to show the other assistant professors that he is not a passive person, when they make suggestions, but is very independent indeed. This can lead to aggressive differences of opinion with other members of the faculty group as a demonstration of his superiority and strength in argument or in intellect, as a denial of the

dependent position, and of the wish to be dependent.

This is the sort of pattern which occurs with some frequency in childhood, when a boy who is ashamed of his good-little-boy impulses to be dependent on his mother or father, tries then to be the bad-little-boy, arguing endlessly and defiantly with his parents, or getting into fights with neighbor boys in order to show how strong, how independent, and how manly he can be.

The question of tenure of office is relevant at this point. The authority and power of the director of the department are lessened to some degree when the department members have university tenure. Under such circumstances, the passivity and dependence on the director are somewhat less, and the subsequent aggressive and hostile impulses may be lessened as well. Tenure of office gives the members of the department some feeling of security beyond their relationships with the director. Unfortunately, however, the growth of temporary grants, of soft money in the budget, and the like, has lessened the percentage of endowment money on which tenure of office must be based; and one must add, with emphasis, that even when there is tenure of office it often is not enough. The career of an instructor or assistant professor still is dependent to some degree upon the favor of the director, his recommendation for promotion, his letters of reference to others, and his division of available department funds.

It seems clear to some of us that the geographic full-time system prevents many of the disastrous developments of passivity and aggressiveness in a medical school department. When the department is structured as it is in Cincinnati, in which "full-time" is defined as meaning that the members of the faculty of the Department of Psychiatry must give 25–30 hours per week to departmental activities and then may do private referral work in additional hours, one has avoided many of the problems outlined in the preceding paragraphs.

Under such an arrangement, the geographic full-time man has a very deep-going independence of the director of the department, in a real and adult sense. He starts with a moderate salary that is to a certain degree at the discretion of the director. If, however, he has tenure of office he is more independent of the director for this portion of his income. However, more to the point, he knows that the rest of his total income comes from his part-time private work. He knows that, if necessary, he could thumb his nose politely at the director of the department. He and his wife and children would not be victims of financial stringency if he had a disagreement with the director which would lead to his leaving the department. He would simply continue with his limited private practice, have enough income to be able to open an office, and then permit his practice to increase up to the size that he would want it, or have time enough and money enough to look around for another academic position. This is a self-respecting type of partial but secure independence in which he not only has an academic career but also has a large and valid degree of security based on his own independent earnings.

In this variety of geographic full-time arrangement, when the man has a realistic degree of independence of the director, he is no longer, or not so deeply, tempted in the direction of having to behave like a child in a family with a father who is in a powerful position of authority. Consequently, the younger members of the faculty are much less tempted to develop attitudes of little-boy dependency on the head of the department as a child might develop a dependence on a father. Further, they would not be in a position of having as men to be dependent on another man, a situation which by many men is regarded as a blow to their masculinity.

In some men such a dependent role unconsciously has certain feminine implications. I now have accumulated a series, relevant to this issue, of 27 experiences with faculty men, some of them as patients and some not. I have heard the faculty men speak of directors of departments in terms

that indicated clearly that his authority is felt as a castrating and feminizing experience. "He's got me by the ———" (five letter word), "He's got me cornered," "He can't do this to me," or "He can't ——— me" (four letter word), or "He can't cut me down," are typical phrases, when the veneer of civilized conversation is put aside for the moment.

If the associate professor, assistant professor, or instructor in a geographic full-time system is not forced, as he might be otherwise, into feelings of passivity, or dependency, or pseudofemininity, he may be relatively free of such passive attitudes and of the anxiety and shame that goes with them. Consequently, he is free of some of the need to behave in a pseudomasculine and aggressive and hostile fashion toward the director of the department and toward his colleagues and contemporaries, free of some of the need to be Oedipus or Cain.

Most of my comments so far have had to do with the favorable impact of the geographic full-time system on the dynamics of the assistant professor and others. However, I must make a parallel remark about the director as well. Under the pure full-time system, the director may be tempted into having a dominating, excessively controlling attitude. Or, under such circumstances, the director may feel so guilty over having such power that he veers then in the opposite direction, of being too gentle in the use of his authority. In the geographic full-time system, the director is not so tempted to a neurotic use of power or to a guilty avoidance of power. His power is limited. His authority is more easily questioned. He must develop techniques of leadership that evoke respect and collaboration rather than submission or rebellion. He must stimulate a deep-going cooperation based on the motivation of the members of his faculty rather than expect them to obey.

It is my impression that under the geographic system one often sees a very great development of congeniality, mutual loyalty, mutual interdependence, mutual responsibility, mutual respect, freedom from back-biting, and freedom from the development of cliques and pressure-groups. Perhaps this means that the success of a department within a medical school is only in part dependent on the assets and liabilities of the personality of the director and of the members of the department. Of great importance, also, is the structure of the department, particularly the specific variation of the geographic full-time system which is in use.

Let me not be misunderstood. I know that there are great values in having some pure full-time positions with no need to devote time to private work, if the salaries are adequate. Also, I know that permission for limited private work can be abused. Further, I know that neurotic sequences are not inevitable in departments organized on a pure full-time basis. The maturity of the director of a strictly full-time department and of the members of his department may prevent the development of disruptive interactions. Rather, my point in a way is that the director of a geographic full-time department need not be so mature as directors in other departments. The structure of such a department does most of the job; or, phrased in another way, the structure of a preclinical department which cannot use the geographic full-time system, or a clinical department which does not, puts an additional stress on the director of the department and on the rest of the faculty. I have the highest respect for the members of a strictly full-time department in which there is only a minimum of destructive passivity and of destructive hostility; they have overcome a structural obstacle which is very great indeed. Perhaps I can summarize my observations this way, that the danger of disruptive personal reactions in a pure full-time situation often is greater than the danger of being distracted by private work in the geographic full-time system.

At this point, a comment is in order about the varieties of the geographic full-time system. I have mentioned that in the Cincinnati Department of Psychiatry we have a strict requirement of a 25–30 hour allocation of time to academic responsibili-

ties and then freedom for referral practice in additional time. Such an arrangement holds true for other departments. However, some other schools and departments have private practice arrangements in which the private practice is done as a group, with fees collected centrally and the distribution of fees allocated by a central authority. This arrangement has many assets, but it violates the central principle advocated in this paper, viz., the high value to the faculty man of having as an individual a partial independence of the central authority within the school or hospital.

Still other schools which use the geographic full-time system place a limit on private practice earnings. Some, for example, have a rule that a man may earn in his private work as much as he receives in salary, with a surplus over such an amount reverting to the school or department. This, too, in terms of the thesis of this paper, is an excessive centralization of authority in a way that limits adult independence. A similar result can be achieved by the simpler procedure used in Cincinnati and elsewhere, of a group scrutiny of whether or not the man's academic performance is such that he obviously is fulfilling his responsibility to devote 25–30 hours to department activities. This he must do; and in addition he has the feeling of independence that goes with the realization that, if he needs some additional money, he can work a few hours more and earn it for himself.

The town-gown problem is relevant at this point. It would seem that the university position is on very safe ground if it is clear that a man is working 25–30 hours, for a modest salary, and so could not possibly have time enough to compete in private work with a man in full private practice, either for a sizeable number of patients or for a high level of income. Under this variant of the geographic full-time system, the faculty man has made a clear choice: He reserves most of his time and energy for his academic career; he has enough private work to give him a fair degree of mature independence; his income is larger than that of most men in pure full-time positions; but his income will never approximate that of a man in full-time private practice.

In this paper the actual figures of 25–30 hours to be devoted to academic work are emphasized not only as a way of indicating a solution to town-gown and other problems. Such an emphasis on 25–30 hours is important also in terms of a psychodynamic problem. A geographic full-time system which requires less than this, which requires too little academic time, not only runs the risk of stirring town-gown problems; it also, with high frequency, stirs serious guilt feelings in the man himself. A man who regards himself as having some variety of full-time post, and yet spends the major part of his time with his private patients, develops, according to my professional and casual observations, a load of guilt that must be prevented. The requirement of a 25–30-hour work week of department responsibilities prevents the misuse of the permission for a limited private practice.

A passing thought: If the faculty person is a woman rather than a man, some of the dynamic formulations I have presented would need to be changed in certain ways. However, my experience with faculty women who, in therapy or otherwise, revealed their more deeply rooted feelings, would indicate that for them, too, a good variant of the geographic full-time system is, or would be, productive.

I recognize that the idea presented in this paper, viz., that the geographic full-time system provides an extremely favorable pattern for medical school departments because the system facilitates an avoidance of destructive neurotic developments, is an impressionistic idea. We then would say that, if such an idea seems important, it could be the subject of a well designed research project. It then would be checked for its accuracy and be evaluated quantitatively.

It would not be too difficult to devise a research design which would test some of the details of my thesis. For example, it might be possible to get records of faculty turnover in a number of departments and rec-

ords of the hour and salary arrangements for the members of the faculty of the same group of departments. These then might be correlated in an adequately controlled statistical fashion, by using, for example, the well-known Lehrer Lobachevsky Pi-Square technique. Or, it might be possible to get facts as to faculty satisfaction by some sort of anonymous questionnaire or by interviewing techniques and again to correlate the findings of such a study with the variety and sources of faculty income. Further, research productiveness, job satisfaction, the happiness of faculty wives, hidden feelings of rage, are all measurable quantities and can be correlated with the type of departmental structure. For fuller accuracy, it would be necessary to consider also the question of whether one or more types of persons are drawn to the geographic full-time system and so accept a job offer in such a department, and whether one or more types of persons are drawn to the strictly full-time system.

However, statistical or experimental verification of an impressionistic idea is not the only fate which may be in store for it. It probably will be forgotten if it does not click with the impressionistic ideas of others in the field. Further, if the idea is not sufficiently central or vital to require that it be checked in an accurate and controlled study, it may have value chiefly as a stimulant to productive thinking on the part of others, and gradually lead to an improvement in concepts or in performance or in technique. Even without exact research design or experimental proof of the value of a change, a good craftsman accepts and uses new principles in his productive workmanship. A valuable type of know-how develops from flexible experience with changes based on convictions which have not been validated with a high degree of accuracy. Similarly, in medical affairs, administrative know-how and well digested experience provide a sound basis for planning by those in positions of leadership and authority.

Perhaps a final comment is in order. In many instances in recent years great stress has been placed on the importance of morale and of good leadership, in the armed forces, in industry, and elsewhere. The discussion in this paper is pertinent to this crucial problem. The generalization can be phrased this way, that plans and patterns based on some awareness of psychodynamics will improve the morale of the group and the effectiveness of its leadership. Psychodynamic observations indicate that strong leadership is crucial, a leadership which avoids the Scylla of dictatorial power and the Charybdis of the abdication of responsibility and initiative. However, perhaps even more important than the character of the leader is the structuring of an institution so that the leader does not have too great a final authority and so that others working with him have adequate feelings of independence. In medical education, the geographic full-time system fosters such a pattern of human relations. Such a structure may lessen the stimulation of childhood residuals in the group, may lessen the drive toward being dependent and cared for and protected, and so may lessen the destructive hostilities which arise as a defense. The diminution of excessive patterns of passivity and aggressiveness may lead to a more creative interplay within the group and with its director, and so to a greater stability and productiveness.

The Career Ambitions and Expectations of Medical Students

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There has been considerable discussion recently about the relative opportunities for medical graduates in this country and elsewhere. It has been argued that prospects here are so limited that many of our young doctors wish to emigrate, attracted by the greater facilities and opportunities overseas and deterred from staying here by present-day conditions.

This study is an attempt to assess the part played by this and other considerations in the decisions made by medical students about their future careers. Information has been sought on these topics: what factors do students take into consideration when deciding in which branch of medicine they want to practice? what do they regard as important in enabling them to attain satisfaction in their work? what is their estimate of the prospects available in this country? which country do they believe offers them the best opportunities?

METHOD

The study covered the fifth-year medical students at Edinburgh University. At the end of a lecture on social medicine, one of the people conducting this study made a brief statement about the purpose of the inquiry. The questionnaires were then handed out, and the majority of the students completed them immediately while they were still in the lecture theatre. Although they were asked to put their names on the forms, it was explained that these would be immediately torn off and a number substituted so that in effect replies would be anonymous and analyses would be purely statistical. The students who had not attended the lecture were contacted at tutorials, so that in the end all the 142 students in that year were included in the study.

STAGE AND NATURE OF DECISION

How many students have definitely decided on the nature of their eventual career, by this stage of their training? One-fifth said they felt quite definite about this; nearly three-fifths, 58 per cent, said they had an inclination but were not quite definite; while the remainder, just over a fifth, still had open minds or only negative feelings.

Whether or not they had definitely made up their minds about their future career, they were asked to rank their preferences for the five main branches of medicine: the hospital or specialist service, academic or research work, general practice, public health or industrial medicine, and the armed forces or colonial service (Table 1). Considering just their first preferences, half of them, 51 per cent, chose the hospital or specialist services; just over a third, 35 per cent, general practice; 6 per cent, the armed forces or colonial service; 4 per cent, public health or industrial medicine; and

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3 per cent, academic or research work. Only two students were not prepared to make a choice.

However, among those who have definitely decided on the nature of their future career, the proportions are rather different: 50 per cent for general practice, 39 per cent for the hospital or specialist services, and 11 per cent for the various other branches.

Those students with relatives in general practice more frequently gave their first preference as general practice than did those with no relatives in that branch of medicine. The actual proportions were 49 per cent and 30 per cent, respectively. This does not suggest that general practitioners are actively dissuading their young relatives from taking up the same career as themselves.

There is also a tendency for students with relatively good academic records, who have not failed any examinations, to prefer the hospital or specialist services more frequently than those who have had some examination difficulties (Table 2).

However, students with relatives in general practice had rather poor academic records, the proportion who had taken an extra year or more over their course because of failure in examinations being three times greater in this group than among those without any relations in that field.

TABLE 1

VARIATIONS IN PREFERENCES FOR DIFFERENT BRANCHES OF MEDICINE WITH THE STAGE OF DECISION REACHED

	Stage of decision			
First preference	Quite definite (per cent)	Inclination (per cent)	Open mind or only negative feelings (per cent)	All students (per cent)
Hospital or specialist service	39	58	45	51
General practice	50	26	45	35
Academic or research work	11	16	10	3
Public health or industrial medicine				4
Armed forces or colonial service				6
Don't know				1
Number of students (=100%):	28	83	31	142

TABLE 2

VARIATIONS IN PREFERENCES FOR DIFFERENT BRANCHES OF MEDICINE WITH ACADEMIC RECORD

	Academic record		
First preference	No failures (per cent)	Failure but no time lost (per cent)	Failure and time lost (per cent)
Hospital or specialist service	61	45	29
General practice	26	43	47
Other branches	13	12	24
Number of students (=100%)	61	58	17

REASONS FOR PREFERENCE

The complex problem of the factors which students take into consideration when making their choice was approached in several ways. First of all, students were simply asked to state the reasons for their choice. The great majority, four-fifths, mentioned the interest and satisfaction they expected to derive from their work as the main reason for their choice, and the only other reason given by any appreciable numbers was the opportunities available in their chosen field or the lack of opportunities in other fields. Nearly one-third, 29 per cent, mentioned this.

Nine of the 36 women in the class, a quarter of them, mentioned their sex in reply to this question, either because they felt that prospects were not so good for women in certain fields, or because certain careers could be more easily combined with marriage. However, there was not any sig-

nificant difference between the sexes in the proportions preferring the different branches of medicine.

The next line of approach in the attempt to ascertain the reasons for the students' choice of career was to ask them to rank six factors according to their importance to them in determining their preferences (Table 3). These factors were: the student's own abilities and limitations, his satisfaction in his work, hours of work, remuneration, locality of work, and the relative opportunities in the different branches of medicine. Professional satisfaction was the factor most often thought to be of first importance, and only 5 per cent of the students did not regard it as the first or second consideration. In an attempt to discover the elements which contribute to this, students were asked to indicate whether they regarded certain factors as very important, fairly important, or not important to them in attaining professional satisfaction (Table 4).

Variety of presenting problems was most generally thought to be very important, and diagnostic problems and contact with other professional people were also thought to be very important by at least half the students. At the other end of the scale status in the community, gratitude of patients, and opportunities for research were not thought to be of primary importance by more than one-fifth of the class.

Budding specialists tend to attach more

TABLE 3

RELATIVE IMPORTANCE OF VARIOUS FACTORS IN DETERMINING CHOICE OF CAREER

Rank	Satisfaction in work (per cent)	Own abilities and limitations (per cent)	Relative opportunities (per cent)	Locality of work (per cent)	Remuneration (per cent)	Hours of work (per cent)
First, i.e., most important	68	27	3	3	—	1
Second	27	49	12	6	8	3
Third	2	10	31	24	20	10
Fourth	1	7	15	26	29	18
Fifth	1	3	13	17	24	39
Sixth, i.e., least important	1	4	26	24	19	29
Average rank:	1.4	2.2	4.0	4.2	4.3	4.8

Their own abilities were more generally ranked second, and the relative opportunities in different branches came third; but as many as a quarter of the students thought this the least important consideration. No one was prepared to say that he thought remuneration was the most important factor, but only one-fifth recorded it as the least important—a lower proportion than for the locality of work, relative opportunities, and hours of work. This last factor was most frequently regarded as the least important.

PROFESSIONAL SATISFACTION

Professional satisfaction has again emerged as the most important factor in determining the students' choice of career. importance to various opportunities for specialization, for the utilization of skilled techniques and for research than did the embryo general practitioners, but even so only a quarter of those hoping to go into the hospital service regard research opportunities as of primary importance to them. Those intending to go into general practice valued the contact with patients and families over a long period of time highly, nearly three-quarters of them describing this as very important.

The elements which are felt to contribute significantly to their professional satisfaction vary considerably for different individuals and groups. What, then, are the students' over-all estimates of the possibility of obtaining professional satisfaction in dif-

ferent spheres in this country? And what are his estimates of other prospects and opportunities in different fields, since the relative opportunities in different branches were also a significant factor in determining his choice of career?

PROSPECTS

All the students were asked whether they felt the prospects in the hospital service and in general practice in Great Britain were good, fair, or poor in relation to four factors —short-term remuneration, long-term remuneration, professional satisfaction, and hours of work. The proportions who thought the prospects were good are shown in Table 5.

More of the students thought the prospects of short-term remuneration were good in general practice than in the hospital service, but the position was reversed in relation to hours of work. Prospects for long-term remuneration were generally felt to be better than those for short-term remuneration, and there was little difference in their estimate of these prospects for long-term remuneration in the hospital service and in general practice. None of these prospects were felt to be good by as many as half of the students, but rather more than half thought prospects for professional satisfaction were good, in each of these branches.

Among those whose first preference was for the hospital service, 82 per cent thought prospects for attaining professional satisfaction in the hospital service were good, while in the group intending to go into general practice 88 per cent thought they had a good prospect of obtaining professional satisfaction in the branch of their choice.

This association between choices of branch and belief about prospects for professional satisfaction was in contrast to the relationship between choice of branch and beliefs about prospects of short term remuneration (Table 6). Whereas 32 per cent of those intending to go into the hospital service thought that the prospects for short-term remuneration in general practice were good, only 19 per cent of those intending to go into general practice thought this. In addition, 9 per cent of those preferring general practice thought those prospects

TABLE 4

PROPORTION STATING CERTAIN FACTORS TO BE VERY IMPORTANT TO THEM IN OBTAINING SATISFACTION IN THEIR WORK

	FIRST CHOICE		
	Hospital service (per cent)	General practice (per cent)	ALL STUDENTS (PER CENT)
Variety of presenting problems	67	60	63
Diagnostic problems	61	51	55
Contact with other professional people	55	47	50
Contact with patients and families over a considerable period of time	28	74	49
Opportunity to specialize	47	9	31
Opportunity to utilize skilled techniques	33	10	25
Opportunities for research	25	6	17
Gratitude of patients	13	10	13
Status in the community	10	12	10
Number of students* (=100%)	73	50	142

* Those who omitted any part of this question were not included when the percentages were calculated.

TABLE 5

PROPORTION BELIEVING CERTAIN PROSPECTS TO BE GOOD IN GREAT BRITAIN

	General practice (per cent)	Hospital service (per cent)
Short-term remuneration	27	4
Long-term remuneration	47	43
Professional satisfaction	57	69
Hours of work	8	25

were good in the hospital service, while only 1 per cent of those hoping to go into this service believed this.

This possibly illustrates the proverb that the grass in the other field looks greener, but it also substantiates the hypothesis that professional satisfaction rather than remuneration is the main basis of the students' decision in deciding their future careers.

Another aspect of the students' estimates of the prospects in different spheres was covered by asking them what length of time they would expect to elapse before commencing work in their chosen field and becoming a consultant in the hospital service or a principal in general practice (Table 7). They were asked to make this guess only if these branches of medicine were their first or second choice.

TABLE 6

VARIATIONS IN THE PROPORTION BELIEVING CERTAIN PROSPECTS TO BE GOOD WITH THEIR OWN CHOICE OF CAREER

	First choice	
	Hospital service (per cent)	General practice (per cent)
Short-term remuneration:		
In general practice	32	19
In the hospital service	1	9
Professional satisfaction:		
In general practice	32	88
In the hospital service	82	57
Number of students (= 100%)	73	50

The difference between the two distributions is striking. One optimist expected to become a consultant in less than 2 years; but no one else expects to reach these heights for at least 5 years, whereas a third of those considering general practice would expect to become principals within that time. The most commonly predicted times were 10–15 years to become a consultant and 5–10 years to become a principal in general practice. There was no indication that those who made these branches their first choice expected to reach the top of the tree any more quickly than those for who it was only the second choice.

Students were also asked about any difficulties they envisaged in pursuing their chosen career. Whereas only 3 per cent of those intending to enter the hospital or specialist service did not expect to encounter any difficulties, a quarter of the corresponding group of students envisaged no difficulties in pursuing a career in general practice. The difficulty most commonly foreseen by both groups was competition and lack of opportunities. This was mentioned by two-thirds of the students in relation to the hospital service and by a half in relation to general practice. Difficulty of obtaining higher qualifications and further experience was envisaged only in relation to the hospital or specialist service, but a third of the students in this group saw this as a possible problem.

TABLE 7

TIME EXPECTED TO ACHIEVE CONSULTANT OR PRINCIPAL STATUS

	Consultant in hospital service (per cent)	Principal in general practice (per cent)
Less than 2 years	1	4
2—less than 5 years	–	29
5—less than 10 years	25	43
10—less than 15 years	31	11
15 years or more	29	3
Never	5	1
Unknown	9	9
Number of students (=100%)	110	98

Preferences for and opportunities in different countries.—Students were asked to say in which country they would prefer to work permanently, quite apart from the question of suitable opportunities or openings. Nearly two-fifths, 37 per cent, would prefer to work in England, a third in Scotland, and 2 per cent in both Ireland and Wales. Just over a quarter, 27 per cent, said they would prefer to work abroad permanently, and 5 per cent gave no answer or had not made up their minds.[1] Of those wanting to go abroad a half did not come initially from the United Kingdom, so that among Scot-

[1] The percentages add to just over a 100, since a few students gave alternatives.

tish, English, Irish, and Welsh students the proportion preferring to work abroad permanently, quite apart from the question of relative opportunities, was one fifth. This proportion was similar for Scottish and English students, but whereas only 5 per cent of English students hope to work in Scotland, 21 per cent of the Scots would like to work in England.

When the students were asked which country they thought would offer them the best opportunities and openings, 16 per cent did not answer or would not commit themselves on this point.

Among those who answered, 43 per cent thought this was provided by some country in the U.K. (30 per cent England, 18 per cent Scotland, 1 per cent and 3 per cent Ireland and Wales).[2] However, over half of those who replied, 57 per cent, thought that better opportunities were offered elsewhere. The countries most frequently put forward were Canada, 24 per cent; Africa, 21 per cent; New Zealand, 12 per cent; Australia, 10 per cent; India, 6 per cent; America, 6 per cent; and other countries, 8 per cent.

For a number of students, therefore, there does appear to be a conflict in that they feel that better opportunities are available in some country other than the one in which they would prefer to work permanently. When this arose, they were asked which they felt was most important to them—work opportunities or their geographical preference. The position is summarized in Table 8.

TABLE 8

CHOICE IN CONFLICT BETWEEN WORK OPPORTUNITIES AND GEOGRAPHICAL PREFERENCE

	Per cent
No conflict, believes opportunities best in country preferred	48
Work opportunities more important than geographical preference	13
Geographical preference more important than work opportunities	6
Divided views	23
No answer to which country offers best opportunities	10*

* This is rather lower than the proportion who did not know which country offered the best opportunities, since a number said merely that the country they preferred to work in permanently was *not* the country which offered the best opportunities.

For less than half the students there is no problem, and another tenth are not yet sure where the best opportunities lie. For the remainder, the majority are not yet sure which will prove to have the strongest pull, the work opportunities or their geographical preference, while among those who have made this decision twice as many put work opportunities before geographical preference rather than the reverse.

DISCUSSION

There is a certain amount of evidence that this group of students are making their choice of career within medicine with a fair degree of realism. Although half the total say their first choice of career at the moment is in the hospital service while one-third favor general practice, among those whose minds were definitely made up, these proportions were reversed. Those who have had examination difficulties less frequently choose the hospital service than those who have not, while those with relatives in general practice more often select this branch of medicine.

On the other hand, the reasons given for choosing their careers show little indication of straightforward opportunism, and if their are any definite opportunists in the group they have suppressed this when answering these questions. The attainment of professional satisfaction is most often stated to be the first consideration when choosing a particular career, and relatively little weight is attached to remuneration, locality, and hours of work when making this decision.

When professional satisfaction is prized so highly, and the prospects for achieving this in Great Britain in their chosen career are regarded as being good by over four-fifths of the students, it is perhaps surprising that so many of them, over a half, believe

[2] Again, some students gave composite answers, the most common one being "Scotland and England."

that better opportunities are available elsewhere. In addition, the fact that a considerable proportion of those who would prefer to work permanently in this country are apparently much attracted by the opportunities overseas suggests that any starry-eyed idealism has been blended with a strong dash of realism and ambition.

ACKNOWLEDGEMENTS

We are grateful to Professor Brotherston for his active help and encouragement, and we would also like to thank Dr. Martin for his advice and assistance. Miss Alice Stephen carried out the tabulating and much of the computing. We would also like to express our gratitude to all the students who answered our questions.

Nicholas Romayne, 1756–1817
Stormy Petrel of American Medical Education

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Medical education in the early years of the United States, with its colorful parade of students and teachers, provides a significant chapter in the social history of the country. In that era of pioneer enthusiasm a number of controversial figures—adventurous and ambitious men—appeared in the ranks of the medical profession.

Painted by John Wesley Jarvis
Courtesy of The New York Academy of Medicine

FIG. 1.—Dr. Nicholas Romayne, age 49 years

Dr. Nicholas Romayne was one of the most able and truculent of the "stormy Hippocrats" bred in a period marked by discord and rivalry among infant medical schools. Remembered chiefly for his role in professional feuds, Romayne was nevertheless an outstanding teacher and organizer during the initial four decades of American independence. As the first president of the College of Physicians and Surgeons in New York City and of the Medical Society of New York, and a versatile scholar-professor alternately in and out of favor with his contemporaries, the impact of Romayne on the profession deserves recall today.

Nicholas Romayne, eldest son of John Romeyn, a New York silversmith, and his wife, Juliana McCarty, was born in New York City in September, 1756. His brother, Jeremiah, and several other of his close relatives were Dutch Reformed clergymen. Nicholas, who altered the spelling of his surname, received his early education at the Hackensack Academy in New Jersey under Dr. Peter Wilson, a Scottish educator who later was professor of languages at Columbia College.

Romayne entered the medical school of King's College, New York, in 1774—shortly before its activities were interrupted by the Revolutionary War. At the commencement of hostilities he went abroad, subsequently receiving an M.D. degree from Edinburgh in 1780. His qualifying thesis on the formation of pus, *De Puris Generatione*, was dedicated to his medical professors in New York[1] and written in polished Latin without the assistance of a "grinder" or hired trans-

[1] Peter Middleton, Samuel Clossy, John Jones, Samuel Bard.

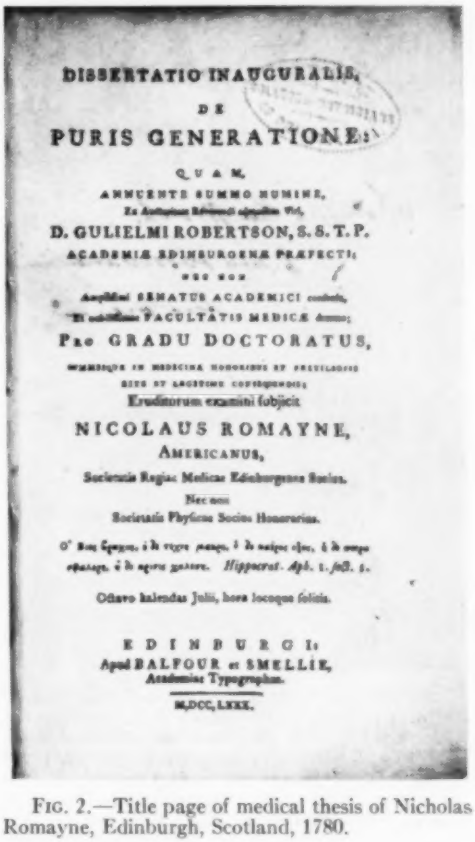
lator, so often employed at the time. Romayne added to previous work by a fellow American, John Morgan of Philadelphia, who had taken his doctorate at Edinburgh, in 1763, with a thesis on the same topic. Despite his obvious penury while a student in Scotland, after receiving his medical degree Romayne spent 2 years in further study at London, Paris, and Leyden. Thus, he obtained a thorough professional education in the best medical setting of his time.

Returning to America in 1782, he settled first in Philadelphia, where he conducted a busy medical practice for a year. Following the British evacuation of New York, Romayne returned there in 1783, where he married Susan, the daughter of Isaac Van Dam, a merchant from the island of St. Eustatius in the Dutch West Indies. The early death of several children born to the couple was a lingering source of sadness to the Romaynes.

Soon after the withdrawal of British military forces, the University of the State of New York was chartered by the state; Romayne was named to its original board of regents in 1784. He served in this capacity for 3 years until the trustees of Columbia College (successor to King's College in New York) were independently chartered in 1787, when he became an original member of that board, finally resigning in 1793. The former faculty of physic was also revived, but Romayne, as a trustee, was technically unable to occupy a chair in the medical school.

In 1785, however, Romayne was elected professor of the practice of physic on the King's College medical faculty, a title he held for 2 years. From 1791 to 1792 he was a lecturer in chemistry, anatomy, and the practice of physic. Because the Columbia College medical department was small and relatively inactive during this interval, from 1787 onward Romayne was mainly occupied with instructing private classes in what was, in effect, his own medical school. Being a man of extensive learning and culture, he attracted numerous students from the United States and Canada. Surviving tributes from students and colleagues attest to his personal charm and ability as a teacher. During his teaching career he taught all branches of medical science; he also spoke French, Dutch, and Latin fluently!

In 1791, Romayne addressed the regents of the university, asking their protection and direction for his school. Shortly afterward he and six associates—capable young physicians—prepared a second memorial describing their plans for instruction. The regents, who were favorably impressed, granted a charter to the group as the College of Physicians and Surgeons in the City of New York. However, at this juncture the Columbia trustees objected forcefully, claiming no need for another medical school in the city and asserting that they were strengthening their already active department. Accordingly the Romayne proposal



DISSERTATIO INAUGURALIS,

DE

PURIS GENERATIONE:

QUAM,

ANNUENTE SUMMO NUMINE,

D. GULIELMI ROBERTSON, S.S.T.P.

ACADEMIÆ EDINBURGENÆ PRÆFECTI;

Pro GRADU DOCTORATUS,

Eruditorum examini subjicit

NICOLAUS ROMAYNE,

AMERICANUS,

Societatis Regiæ Medicæ Edinburgenæ Socius.

Nec non

Societatis Physicæ Socius Honorarius.

Octavo kalendas Julii, horis locoque solitis.

EDINBURGI:

Apud BALFOUR et SMELLIE,

Academiæ Typographos.

M,DCC,LXXX.

FIG. 2.—Title page of medical thesis of Nicholas Romayne, Edinburgh, Scotland, 1780.

was suspended by the regents. At this point, Romayne arranged for an out-of-state degree-granting arrangement which would lend authority to his project. He approached the trustees of Queen's (later Rutgers) College at New Brunswick, New Jersey, to obtain the desired sanction. This incident was the first of three occasions when Rutgers had a participating relationship with a medical school; twice it actually had such a professional school as part of its working organization.

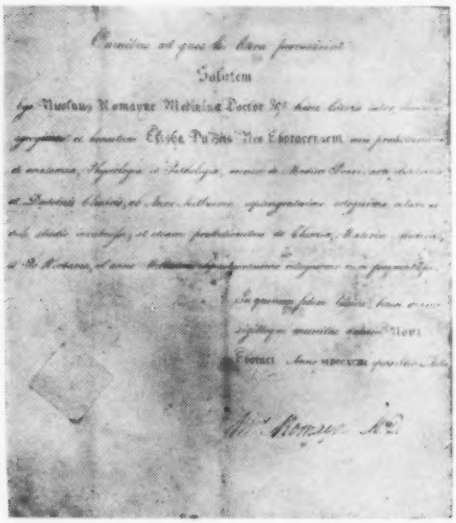


FIG. 3.—Certificate presented to Elisha Du Bois on July 15, 1793, for proficiency in medical studies. Manuscript in Latin on vellum, with seal and signature of Dr. Romayne. A similar certificate was given to Du Bois for his service among the sick in New York from 1788 to 1793. Originals in The New York Academy of Medicine.

On April 10, 1792, the trustees of Queen's College received a letter from Romayne stating that for several years he had been teaching medical students in New York; in 1791, 56 students were in his classes. His message indicated that it was vital that these students have some connection with an institution to which they could give proof of their proficiency and from which they could obtain academic credentials. He suggested that advantage would come to the college through such connection, in both the widening of its influence and the increase of its revenues. The trustees appointed a committee to confer with Romayne. He requested that he be appointed professor of physic and that several physicians associated with him in New York be designated a faculty—on certificate from which the college at New Brunswick would grant the degree of Bachelor of Medicine or Doctor of Medicine, as the case might be. The fee for the Bachelor's degree would be £5 and, for the Doctor's degree, £10.

Two of Romayne's students from Canada, Francis Rientord and John Baptist Rientord, received the M.B. degree in September, 1792, as did Charles Smith, a leading practitioner in New Brunswick. Also in that year the honorary M.D. degree was conferred on four New York physicians. In 1793, Queen's College continued graduating physicians, conferring the M.D. degree on six men, and the same degree *ad eundem* on Nicholas Romayne and his associates, Richard S. Kissam and William Moore (although the three were already graduates in medicine from Edinburgh).

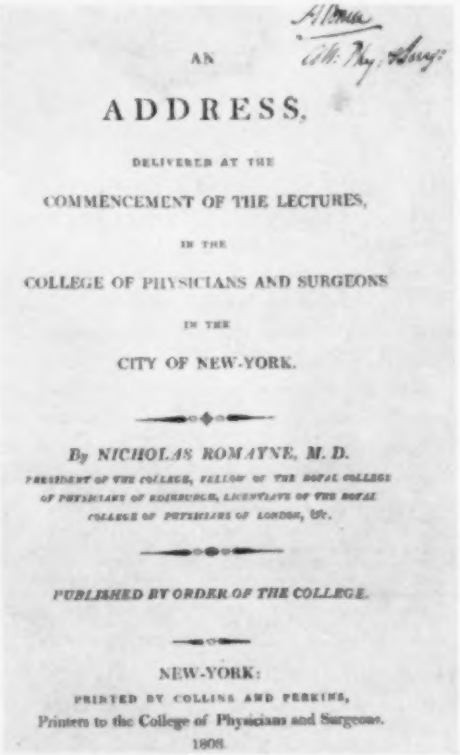
A total of fifteen medical degrees were granted by Queen's College in this first incident before the school closed. The New Jersey affair placed Romayne under the ban of the medical profession in New York; he discontinued teaching late in 1793, and sailed to Europe for further study and observation. He became a licentiate of the Royal College of Physicians of London on December 22, 1795.

While abroad, Romayne began correspondence with British agents and William Blount, a senator from Tennessee whom he had met in 1782, through whom he expected to acquire wealth from large tracts of land in the South and West. Associates in this scheme which later developed into a conspiracy to violate the neutrality of the United States (coupling the United States and Great Britain against Spain and France) included Blount, Romayne, John Philip Ripley, son of the president of Dartmouth College, his Dartmouth classmate, William Eaton, and Thomas Odiorne. Their

plan was to incite the Creek and Choctaw Indians to aid the British in attempting to wrest the Louisiana Territory from the French and Spaniards. (Romayne's subsequent publication on the ethnology of the red man may have stemmed from this period of intrigue.)

These political and territorial manipulations ultimately led to the arrest and imprisonment of the principals involved in this plot. On order of President John Adams, Romayne was arrested at his New York home in July, 1797, and transported to Philadelphia to testify before a Committee of the House of Representatives on his role in Blount's conspiracy. Intercepted correspondence between Blount and Roymane was produced, although Romayne had already destroyed the pieces in his possession. The doctor spent some time in prison at Philadelphia for his part in this treacherous business, and William Blount was expelled from the Senate for "high misdemeanors entirely inconsistent with his public trust and duty." The testimony concerning this incident was published in 1798, by government order.[2] After his release from prison, Romayne, who sensed that his countrymen regarded him with disfavor, again left the country for a stay in Europe. He was admitted as a fellow of the Royal College of Physicians of Edinburgh on November 4, 1800. In 1805, the New York Hospital acquired his medical library—at a time when Romayne proposed to retire from practice. This collection was a fine addition to the hospital library, which had been founded 4 years earlier.

In 1806, following an act passed by the New York legislature to incorporate state and county medical societies, "by a sudden and singular change of sentiment" Nicholas Romayne was called from his retirement to be elected first president of the Medical Society of the City and County of New York. The following year he was a delegate to the meeting of the state society at Albany, and became its president in 1810. The *Anniversary Address* to the New York State Medical Society, delivered by Romayne and published by the society in 1811, provided an interesting review of medical education from earliest times up to that day—with particular emphasis on instruction in New York and Philadelphia.



AN

ADDRESS,

DELIVERED AT THE

COMMENCEMENT OF THE LECTURES,

IN THE

COLLEGE OF PHYSICIANS AND SURGEONS

IN THE

CITY OF NEW-YORK.

By NICHOLAS ROMAYNE, M. D.

PRESIDENT OF THE COLLEGE, FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, LICENTIATE OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON, &c.

PUBLISHED BY ORDER OF THE COLLEGE.

NEW-YORK:

PRINTED BY COLLINS AND PERKINS,

Printers to the College of Physicians and Surgeons.

1808.

FIG. 4.—Title page of inaugural address by Nicholas Romayne at the opening of the College of Physicians and Surgeons. Delivered in November, 1807, and published in 1808.

Romayne, the *entrepreneur*, was again in his idiom—planning and executing new projects in medical education. When the College of Physicians and Surgeons, which had been dormant since 1791, was revived in 1807, Romayne was made president and trustee. In 1807–1808, in the absence of a

[2] Report of the Committee of the House of Representatives of the United States appointed to prepare and report Articles of Impeachment against William Blount, A Senator of the United States, impeached of high crimes and misdemeanors; . . . Printed by order of the House of Representatives, John Fenno, Philadelphia, 1798.

professor, he gave lectures in anatomy; in 1808 he also served as professor of the institutes of medicine (physiology). He gave the *Address Delivered at the Commencement of the Lectures* in November, 1807, and published it the next year. This publication, a review of the customs and habits of the American Indian, is an account of lasting historical value.

The new school offered a curriculum based on contemporary London and Paris teaching, and listed an impressive faculty in its 1808 *Report* to the Regents of the University of the State of New York. The faculty consisted of Drs. Nicholas Romayne, president and lecturer on anatomy; Samuel Latham Mitchill, vice-president and professor of chemistry; Edward Miller, professor of the practice of physic and lecturer on clinical medicine; David Hosack, professor of materia medica and botany and lecturer on surgery and midwifery; Archibald Bruce, professor of mineralogy; Benjamin DeWitt, professor of the institutes of medicine and lecturer on chemistry; and John Augustine Smith, adjunct lecturer on anatomy.

It was not long, however, before difficulties arose in the form of faculty squabbles and student problems. As a result of these dissensions, in 1811, the president and several of the professors resigned. Romayne then led the secession party back to New Jersey for another degree-granting agreement. They drew up a document, dated December 14, 1811, addressed to the president and trustees of Queen's College. This official paper requested that their organization, the "Medical Institution of the State of New York," be given an academic connection with the New Jersey college. This document was signed by six eminent physicians: Drs. Archibald Bruce, Nicholas Romayne, John Watts, Jr., John Griscom, Thomas Cock, and Valentine Seaman. The proposal was accompanied by a letter explaining the motives which animated the institution's founders. It also noted the plan of instruction and propriety of academic supervision of the curriculum and awarding of degrees, and the necessity of conducting teaching in a large city where necessary facilities and hospital connections were available. The school was to be conducted, as before, in New York City.

The project was adopted by Queen's College on January 21, 1812. Dr. Robert Bayard and the six signers, all of whom were named professors, constituted the "Faculty of Medicine of Queen's College in New Jersey." Romayne became professor of the institutes of medicine and forensic medicine. In its annual report for 1812, this faculty stated that medical instruction had begun on the preceding November 4, that 100, 51, and 37 students, respectively, had attended certain groups of lectures, and that excellent facilities were available for the study of medicine. The classes were held in a building at 204 Duane Street, New York.

In 1812 five candidates received the M.D. degree; in 1813, one; in 1814, two; in 1815, seven, and in 1816, six. One man, James Livingston Van Kluck, a physician from Poughkeepsie who had been recommended by Romayne for a medical degree 19 years earlier, received it belatedly in 1812! Among those granted Queen's diplomas in 1816 was Samuel Rodman Drake, the physician-poet remembered as the author of *The American Flag*. This second long-distance degree relationship lasted only 4 years, during which time annual reports were submitted by the medical faculty to the trustees in New Jersey. Twenty-one students received their medical degrees during the period of affiliation. The fact that relatively few of the students were graduated indicates the high standards maintained by Romayne and his colleagues. In September, 1816, Queen's College suspended operations for financial reasons, and the faculty of physic was thereby denied the patronage of the parent institution. (It was not until 1825 that the New Brunswick institution reopened under the name of Rutgers College.)

Meanwhile, in 1814, the Medical Department of Columbia College, which had not prospered (having graduated only 35 students in 25 years), was abandoned, and its professors were transferred to the College of

Physicians and Surgeons—from which Romayne and his associates had rebelled. The venerable Dr. Samuel Bard became president of the merged faculty; this lasting coalition was the parent of today's College of Physicians and Surgeons of Columbia University.

On July 21, 1817, Nicholas Romayne died at the age of 61 in New York from overexposure to heat. His death removed a stormy petrel from the arena of medical education.

A contemporary, Dr. John W. Francis of New York, summarized the dynamic Romayne's turbulent career:

> A monograph on Romayne would not be too much. He was clever in every acceptance of the word, . . . an extraordinary man, . . . a pleasing speaker, . . . an original observer and an intrepid thinker, . . . unwearied in toil, and of mighty energy. He was goaded by a strong ambition to excel in whatever he undertook, and he generally secured the object of his desire, at least professionally. . . . Though many of his acts were crooked, . . . he was generous to the young and ready with many resources to advance the student. He made a great study of man; he was dextrous with legislative bodies, and at one period of his career was vested with almost all the honors the medical profession amongst us can bestow.

Concluding his volume, *Medical Education in the United States before the Civil War*, Dr. William F. Norwood, a contemporary scholar, includes Nicholas Romayne among the early leaders in American medical education:

> Formal medical education in the United States had its beginning in 1765, a decade before the opening of those tumultuous years that saw the passing of a social order and the birth of a nation. Already individualism was typically American, and personal liberty was cherished from New England to Georgia. Adventuresome Englishmen had become ingenious Americans. . . . The profession, despite its deficiencies and lack of unity, produced many brilliant educators, men whose names will live on because they were Americans as well as physicians, teachers, and contributors to medical literature. Benjamin Rush, Nicholas Romayne, David Hosack, the Warrens, Nathan Smith, John Delamater, Daniel Drake, N. S. Davis, and scores of other names will always be associated with American medical education and the progress of the healing art.

ACKNOWLEDGMENT

The author acknowledges assistance of Miss Gertrude L. Annan, Librarian, and Mrs. Alice D. Weaver, Rare Book Room, The New York Academy of Medicine.

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A Study of the Medical College Admission Test in Relation to Academic Difficulties in Medical School*

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The Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, North Carolina, and the Association of American Medical Colleges, Evanston, Ill.

At the 1957 meeting of the Admissions Conference of the Southern Association of Medical Colleges and Teaching Hospitals, Dr. James Dinning of the University of Arkansas School of Medicine reported (1) a pilot study at his institution, the results of which suggested the existence of a relationship between the rate of course failures in medical school and the average of the four individual scores of the Medical College Admission Test (MCAT). There also appeared to be a relation between the Science Achievement score of the MCAT and the course failure rate in medical school and also the failure rate on the National Board examination. In that study, the course failure rate increased progressively as the MCAT scores dropped below the 500 level. Dykman and Stalnaker (2) previously had reported, for the class entering in 1949 (79 medical schools), a qualitative relationship between the percentage of students who were irregular or drop-outs and the MCAT scores. Also, they reported that the average MCAT scores for those failing were lower than for any other cause of drop-outs.

The report of Dr. Dinning caused considerable discussion concerning the value of the MCAT scores as predictors of the successful completion of the courses in the medical curriculum. It was the consensus of the group that a more extensive study of such possible relations would be of value. This report is the result of such a study, and it is published not only because of its content but also because it illustrates a type of cooperative research that can be carried out among medical schools without too much effort or difficulty. The purpose of the study was to detect possible relationships between the performance of students on the several sections of the MCAT and their subsequent success in medical school as measured by the criterion of having satisfactorily completed the major courses in the medical school curriculum.

Method of data collection.—Fourteen schools in the Southern Association were selected as a representative sample, and the class entering these schools in 1952 was chosen as the one to be studied. The sample studied included 1,224 students. The individual scores for all sections of the MCAT for each student enrolling in these schools were furnished by the Association of American Medical Colleges. These lists were sent to each participating school, and they furnished data concerning courses failed by each student, the students who repeated a year's study, and the students who with-

* Paper presented October 11, 1958, at the Annual Meeting of the Continuing Group on Student Evaluation, Philadelphia, Pennsylvania.

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§ Research Statistician, AAMC.

drew from school, together with the reason for withdrawal. These data covered the 4 years this class was enrolled in medical school. In addition, other data were furnished, but no attempt has been made yet to analyze the additional data. The schools indicated, in most cases, which courses they considered major and which ones minor. When no such indication was given, we arbitrarily selected 55 clock hours as the dividing line between these two categories. All data which have been expressed as percentages have been rounded off to the nearest whole number.

Analysis of data.—As a preliminary to the analysis of the data, the results from the fourteen schools were tabulated on the basis of several classifications of the progress of the students through the medical curriculum and without reference to the scores attained on the MCAT. Inspection of such a tabulation of the data revealed the possibility that the schools might be divided into two distinct and separate categories or clusters on the basis of differences in the student progress classifications. Table 1 gives such a separation of the schools into two clusters on the basis of the following mutually exclusive progress classifications: regular students, i.e., those who graduated without any irregularity in their progress through medical school; those students who failed one major course in the 4 years; those students failing two or more major courses; those students repeating 1 year of the curriculum; and those students withdrawing from school.

Inspection of the data given in Table 1 reveals several ways in which the schools of the two clusters differ. These differences are seen most strikingly in the sub-total percentages for the two clusters, particularly the differences in the "Two or More Failures," "Repeater," and "Withdrawal" classifications of student progress. In the Cluster I schools, 27 students (4 per cent) failed two or more courses in the 4 years, while in the Cluster II schools, only one student (0.2 per cent) failed two or more courses. The differences between the two clusters of schools are equally impressive in the other progress classifications. It is of great interest that in the Cluster I schools an average of only 69

TABLE 1

DISTRIBUTION OF STUDENTS BY PROGRESS CLASSIFICATION

School	Regular		One Failure		Two Failures		Repeaters		Withdrawals		Total
	N	%	N	%	N	%	N	%	N	%	N
Cluster I											
A	48	56	10	11	10	11	9	10	10	12	
B	61	67	5	6	3	3	7	8	14	16	
C	36	69	7	13	0	0	0	0	9	17	
D	43	75	6	11	1	2	0	0	7	12	
E	82	71	0	0	0	0	12	10	22	19	
F	122	80	3	2	0	0	7	5	19	13	
G	79	62	20	15	13	10	2	2	13	10	
Totals:	471	69	51	8	27	4	37	5	94	14	680
Cluster II											
H	67	93	0	0	0	0	0	0	5	7	
I	66	92	1	1	0	0	0	0	5	7	
J	90	90	5	5	0	0	0	0	5	5	
K	54	91	2	3	0	0	2	3	2	3	
L	93	94	0	0	0	0	0	0	6	6	
M	75	83	5	6	1	1	2	2	7	8	
N	47	92	1	2	0	0	0	0	3	6	
Totals:	492	90	14	3	1	0.2	4	0.7	33	6	544
TOTALS:	963	79	65	5	28	2	41	4	127	10	1224

N = Number of students.

per cent (range: 56–80 per cent) of the students enrolled as freshmen in 1952 completed medical school without some irregularity in their progress through the curriculum, whereas in the Cluster II schools an average of 90 per cent (range: 83–94 per cent) completed the curriculum without irregularities.

Table 2 gives the data illustrating the differences in the successful completion of the medical curriculum and a breakdown of the

TABLE 2

DISTRIBUTION OF STUDENTS BY WITHDRAWAL CLASSIFICATION

SCHOOL	GRADUATES N	GRADUATES %	ACADEMIC WITHDRAWALS N	ACADEMIC WITHDRAWALS %	NON-ACADEMIC WITHDRAWALS N	NON-ACADEMIC WITHDRAWALS %	TOTAL N
			Cluster I				
A	77	88	4	5	6	7	
B	76	84	7	8	7	8	
C	43	82	3	6	6	12	
D	50	88	3	5	4	7	
E	94	81	19	16	3	3	
F	132	87	10	7	9	6	
G	114	89	6	5	7	6	
Totals:	586	86	52	8	42	6	680
			Cluster II				
H	67	93	2	3	3	4	
I	67	93	1	1	4	6	
J	95	95	2	2	3	3	
K	58	97	0	0	2	3	
L	93	94	4	4	2	2	
M	83	92	3	4	4	4	
N	48	94	2	4	1	2	
Totals:	511	94	14	3	19	3	544
TOTALS:	1097	90	66	5	61	5	1224

N = Number of students.

"Withdrawal" category between the two clusters of schools. The differences between the two clusters of schools are also strikingly revealed by these data. In the Cluster I schools only 86 per cent (range: 81–89 per cent) of the students admitted graduated, while in the Cluster II schools 94 per cent (range: 92–97 per cent) graduated. Note also that the "Academic Withdrawal" rate in Cluster I is nearly 3 times that in Cluster II, and the rate for "Non-Academic Withdrawals" is twice that of Cluster II.

It is obvious that the sample chosen for study is not homogenous but in reality represents perhaps samples of two distinct populations of schools. Therefore, we must examine each sample, represented by each cluster, for relationships that may exist between the scores attained on the MCAT and the progress of the student through the curriculum. In addition, we must determine whether a difference exists between the two clusters with respect to the MCAT scores attained by the students of the several schools.

MCAT distribution for the clusters.—The percentage distribution for a number of ranges of MCAT scores for the two clusters was calculated. Chart 1 gives this distribution of ranges of scores for the two clusters for the four sections of the MCAT, as well as for the averages of two combinations of MCAT scores. In spite of a tendency for skewness to the right in Cluster I and for skewness to the left in Cluster II, it will be seen that the distribution is relatively normal for both clusters. To determine whether there is a real difference between the MCAT scores for the schools of the two clusters, the

differences between the mean values of the scores on the four sections of the MCAT were compared by Students "*t*" test. The mean values for the scores, in two-digit figures only, are given on the right of Chart 1, together with the probabilities. The differences in mean values on the four sections of the MCAT between the two clusters of schools are relatively small; nevertheless, they are significant and show that on the average the schools in Cluster II admitted students with higher MCAT scores in the various sections of the test:

Comparison of the two clusters in the low MCAT score range.—The demonstration above that Cluster II schools admitted students with significantly higher scores on the MCAT than Cluster I schools raised the obvious question whether or not the greater percentage of regular students in Cluster II could be due primarily to the fewer number of students in the lower MCAT ranges admitted to the Cluster II schools. If this were the case, the apparent difference between the two clusters of schools would be explained, and in reality there would be no essential difference between the two clusters when comparable samples were examined. To test this, a comparison was made between the two clusters for that group of students having MCAT scores below the 23 percentile level. Table 3 shows the tabulation of these data. As would be expected, the percentage of students of Cluster II schools in the low MCAT range is appreciably less than for the Cluster I schools. Nevertheless,

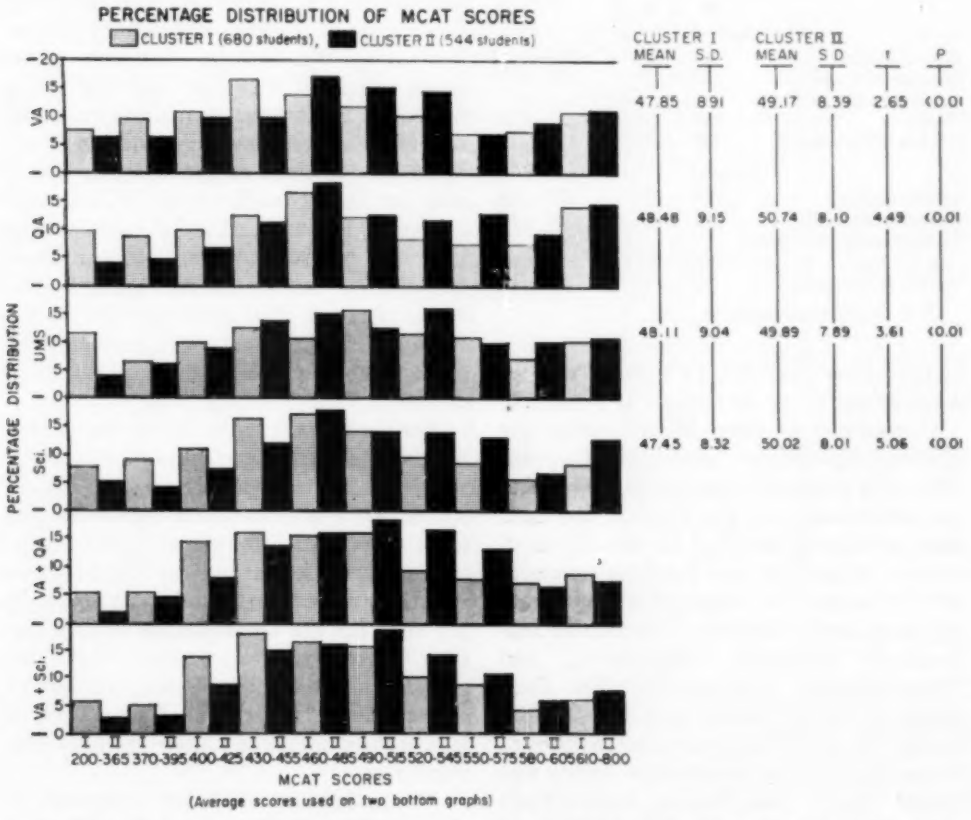

CHART 1.—Percentage distributions of medical college admission test scores of the class entering in 1952 in 14 southern medical schools.

it is obvious that there is still a striking difference between the clusters in the percentage of regular students even in this low MCAT range. This is true for all sections of the MCAT. For illustration, only 54 per cent of the students in Cluster I schools with a Quantitative Ability score below 425 remained regular through the 4 years of medical school, while 87 per cent of such students in the Cluster II schools remained regular.

These results show that there is a fundamental difference between the schools of the two clusters as regards student progress. The difference cannot be explained entirely by the higher mean MCAT scores of the students admitted to the Cluster II schools.

TABLE 3

DISTRIBUTION OF STUDENTS WITH MCAT SCORES BELOW 425 (23 PERCENTILE)

	TOTAL		REGULAR	
	N	%	N	%
Cluster I				
Verbal ability	186	27	112	60
Quantitative ability	186	27	101	54
Understanding modern society	183	27	113	62
Science achievement	180	26	108	60
Cluster II				
Verbal ability	119	22	102	86
Quantitative ability	83	15	72	87
Understanding modern society	98	18	89	91
Science achievement	86	16	75	87

N = Number of students.

Comparison of three MCAT ranges for academic difficulties.—To test for the possibility that academic irregularity is related to the performance on the MCAT, the data were tabulated according to the causes of student irregularity and for three ranges of MCAT scores. The classes of student progress used were: "Regular," "Academic Difficulties," "Academic Withdrawals," and "Non-Academic Withdrawals." The three ranges of MCAT scores used for the four sections of the MCAT plus combinations of Verbal Ability plus Quantitative Ability and Verbal Ability plus Science Achievement were: 425 and below, 430–515, and 520 and above. The "Academic Difficulties" category included all students failing one or more courses or repeating a year. The data are presented in Table 4.

When one compares the two lower ranges of MCAT scores for the Cluster I schools there was an appreciable difference in the percentage distribution of students in the "Academic Difficulties" category for the Quantitative Ability and the average of Verbal Ability plus Quantitative Ability sections of the MCAT; otherwise, the differences in percentage distribution of students for the two lower ranges of MCAT are nonexistent or small in this category of student progress. Without exception, in the "Academic Withdrawals" category of irregularity there was a considerable difference in the percentage distribution of students for the two lower ranges of MCAT scores for all sections of the MCAT. At least twice the percentage of students in the "425 and below" range withdrew for academic reasons when compared with the "430–515" range of scores. In contrast, no very remarkable difference in percentage distribution of students for the three ranges of scores will be seen for the "Non-Academic Withdrawal" category. However, it is of some interest that the highest rate of "Non-Academic Withdrawal" occurred in the highest MCAT range of scores (520 or higher) for all sections of the MCAT, except Science Achievement, where the lowest rate was in this range of scores.

For the Cluster I schools, the lowest rate of students graduating without irregularity will be found in the lowest range of MCAT scores (425 and below). For the several sections of the MCAT the percentage of regular students in the lowest range of MCAT scores was never more than 62 and was as low as 54 per cent for the Quantitative Ability section. Of equal interest, perhaps, is the fact that, even in the highest range of MCAT scores (520 or higher), only 83 per cent, or less, of the students of Cluster I schools were regular.

The probability of chance occurrence of the distribution of students for Cluster I schools, as recorded in Table 4, was deter-

TABLE 4

Distribution of Students with Academic Difficulties for Three MCAT Ranges

MCAT range	Regular N	Regular %	Academic difficulties N	Academic difficulties %	Academic withdrawals N	Academic withdrawals %	Non-Academic withdrawals N	Non-Academic withdrawals %	Chi²	P
Cluster I										
					Verbal Ability					
<425	112	60	38	20	27	15	9	5		
430–515	191	68	53	19	19	7	16	6		
>520	168	78	24	11	6	3	17	8	30.960	<0.001
					Quantitative Ability					
<425	101	54	45	24	28	15	12	6		
430–515	196	73	42	16	16	6	15	6		
>520	174	77	28	12	8	4	15	7	36.977	<0.001
					Understanding Modern Society					
<425	113	62	37	20	24	13	9	5		
430–515	177	70	51	20	11	4	13	5		
>520	181	74	27	11	17	7	20	8	23.655	<0.001
					Science Achievement					
<425	108	60	33	18	28	16	11	6		
430–515	205	66	64	21	17	5	24	8		
>520	158	83	18	9	7	4	7	4	39.203	<0.001
					Verbal Ability + Quantitative Ability (average)					
<425	89	55	37	23	26	16	10	6		
430–515	224	71	56	18	20	6	16	5		
>520	158	78	22	11	6	3	16	8	37.990	<0.001
					Verbal Ability + Science Achievement (average)					
<425	91	57	32	20	28	18	9	6		
430–515	230	69	67	20	19	6	18	5		
>520	150	81	16	9	5	3	15	8	47.1168	<0.001
Cluster II										
					Verbal Ability					
<425	102	86	8	7	4	3	5	4		
430–515	205	93	6	3	5	2	4	2		
>520	185	90	5	2	5	2	10	5	8.245	<0.25>0.2
					Quantitative Ability					
<425	72	87	3	4	4	5	4	5		
430–515	202	92	7	3	3	1	8	4		
>520	218	90	9	4	7	3	7	3	3.819	<0.75>0.7
					Understanding Modern Society					
<425	89	91	5	5	2	2	2	2		
430–515	189	88	7	3	8	4	11	5		
>520	214	93	7	3	4	2	6	3	5.960	<0.5>0.3
					Science Achievement					
<425	75	87	2	2	5	6	4	5		
430–515	207	91	8	4	2	1	11	5		
>520	210	91	9	4	7	3	4	2	10.567	<0.2>0.1
					Verbal Ability + Quantitative Ability (average)					
<425	59	83	6	8	5	7	1	1		
430–515	233	92	6	2	3	1	11	4		
>520	200	91	7	3	6	3	7	3	10.731	<0.1>0.05
					Verbal Ability + Science Achievement (average)					
<425	67	87	3	4	4	5	3	4		
430–515	245	91	10	4	5	2	8	3		
>520	180	90	6	3	5	3	8	4	3.275	<0.8>0.75

N = Number of students.

mined by the Chi Square technique. The probability was less than 1 in 1000 for all sections of the MCAT tested. Therefore, we conclude that there is a significant relationship between the MCAT scores attained and the progress of the student through the medical curriculum in the schools of Cluster I. The most outstanding relationship between MCAT scores and student irregularity was found in the "Academic Withdrawal" category of irregularity.

As shown in Table 4, no trend in the distribution of students between the three ranges of MCAT scores could be seen for the Cluster II schools. Also, the Chi Square values indicate that the probability of chance occurrence of the distribution, as recorded is so high that we conclude there is no significant relationship between MCAT scores and the progress of the students in Cluster II schools.

The effect of two arbitrarily chosen cut-off points for MCAT scores.—The significant relation demonstrated between the MCAT scores and the progress of the students in Cluster I schools suggested that the effect be analyzed of applying a cut-off point for MCAT scores. Thus, the effect of eliminating students with MCAT scores of 425 or below, on the one hand, or with scores of 485 or below, on the other hand, were studied. The results of this analysis are given in Table 5. For convenience of comparison, the distribution for all students of Cluster I schools (MCAT scores > 200) is given on the first line of Table 5. This manipulation was not applied to the schools of Cluster II, since no significant relation had been demonstrated between the MCAT scores and the progress of the students in the Cluster II schools.

Elimination of all students in Cluster I

TABLE 5

THE EFFECT OF ELIMINATING STUDENTS WITH MCAT SCORES BELOW TWO ARBITRARILY CHOSEN SCORES

	Total		Regular		One or more failures		Repeaters		Total academic difficulties		Academic withdrawals		Non-academic withdrawals	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Cluster I														
>200	680	100	471	69	78	12	37	5	115	17	52	8	42	6
Verbal Ability														
>430	494	73	359	72	51	10	26	5	77	16	25	5	33	7
>490	294	43	227	77	27	9	9	3	36	12	10	3	21	7
Quantitative Ability														
>430	494	73	370	75	50	10	20	4	70	14	24	5	30	6
>490	304	45	226	74	33	11	10	3	43	14	15	5	20	7
Understanding Modern Society														
>430	497	73	358	72	55	11	23	5	78	16	28	6	33	7
>490	346	51	253	73	34	10	14	4	48	14	19	6	26	8
Science Achievement														
>430	500	74	363	73	58	12	24	5	82	16	24	5	31	6
>490	280	41	212	76	31	11	7	3	38	14	13	5	17	6
Verbal Ability + Quantitative Ability (average)														
>430	518	76	382	74	55	11	23	4	78	15	26	5	32	6
>490	306	45	237	78	31	10	8	3	39	13	11	4	19	6
Verbal Ability + Science Achievement (average)														
>430	520	77	380	73	57	11	26	5	83	16	24	5	33	6
>490	293	43	227	78	29	10	8	3	36	12	9	3	20	7

N = Number of students.

schools with MCAT scores of 425 or below, i.e., elimination of from 23 to 27 per cent of the students in these schools, increased the percentage of regular students by from 3 to 6 per cent, depending on the section of the MCAT being examined. However, the changes in percentage, brought about by the elimination of these students, were slight for the other progress classifications. Eliminating all students in the Cluster I schools with MCAT scores of 485 or below, i.e., eliminating from 49 to 59 per cent of the students in these schools, changed the percentage figures appreciably in a few of the sections of the MCAT for the several categories of student progress; but in the majority of instances the changes were slight.

DISCUSSION

Further examination of the effect of applying an arbitrarily selected cut-off point for the MCAT scores raises some question concerning the wisdom of this procedure. Applying a cut-off point of a score of 425 or below to the students admitted to the Cluster I schools means that from 24 to 28 students, depending upon the MCAT section chosen, who withdrew subsequently for academic reasons would not have been admitted. Although it is true that approximately one-half of the students in Cluster I schools who withdrew for this reason fell in the low MCAT category, it is also true that the application of the cut-off would mean that from 123 to 150[1] students who graduated subsequently would not have been admitted, and, of these, 89–113 students graduated without academic difficulties as defined here. Certainly, other things being equal, if these schools had filled their places in the class with individuals who had higher MCAT scores, the results given here indicate that there would have been fewer academic problems. However, if the choice were between not filling places or selecting students with the lower MCAT scores, one could question the wisdom of the application of a cut-off for the MCAT scores. In Cluster II schools there is little or no justification for the application of a MCAT cut-off.

These data are presented not as absolute criteria that can be applied to every school, for we have seen that, based on this sample, there are at least two types of schools with respect to the single characteristic of "Academic Difficulties." However, the data illustrate an approach that may be used by each school in analyzing its own data covering a sufficiently large sample to be significant. Also, it must be pointed out that other factors which might affect the distribution of students in the several classifications have not been considered. One such factor is the undergraduate performance record of the students as reflected by the Grade Point Average. Data are available for such a study, and we hope such an analysis can be made.

An obvious question is, "What accounts for the difference between the two types of schools with respect to the 'Academic Difficulty' category?" An examination of the component schools of the two clusters reveals no obvious reasons that would have led to a prediction of the clustering. There was no striking geographic difference between the clusters. In Cluster I there were three tax-supported schools and four private schools; in Cluster II the distribution was four and three, respectively. In the Cluster I schools the mean and standard error for the ratio applicants/actual admissions was 6.39 ± 1.678, while for Cluster II schools the value was 6.19 ± 1.755. The same values for the ratio applicants/stated class size was 5.98 ± 1.663 and 4.55 ± 1.72, respectively. Neither of these differences is significant; so the difference between the clusters cannot be explained on the basis of a relatively larger group of applicants for

[1] The ranges of figures are necessary because the actual figures differ for the several MCAT sections. As an example: applying the cut-off of 425 or below to the "Verbal Ability plus Science Achievement" MCAT section means that 160 students would not have been admitted (see Table 5). Of these, 37 withdrew for one of the two reasons given (difference between 94 withdrawals for all students and 57 for those with MCAT scores > 430). Thus, 123 of these students graduated, and 91 of them graduated without difficulty (difference between 471 regular for all students and 380 regular for those with MCAT scores > 430).

either cluster. Some other possible factors that may be considered are:

1. The Cluster II schools attract students with greater aptitude. We have seen that the mean MCAT scores for Cluster II schools are slightly, but significantly, greater than those for Cluster I. However, this cannot be the only explanation. As an illustration, if we compare the two clusters in the Verbal Ability section for the 25 percentile group, we see that Cluster I schools admitted 186 students in this category and that only 60 per cent of these were regular, whereas Cluster II schools admitted 119 students in this category but 86 per cent of these were regular (Table 3). The same comparison is true for all sections of the MCAT.

2. The students in Cluster II schools are better prepared for the study of medicine. No data are available as yet to evaluate this factor.

3. There is a significant difference in the quality of instruction between the schools of the two clusters.

4. The standards for progress of the student are lower in Cluster II schools.

Surely it would be an over-simplification to look for a single characteristic that would distinguish these two types of schools with respect to student progress. However, one can suggest that each school will take the information presented here as a stimulus and guide for a critical self-evaluation of the factors discussed here.

SUMMARY

With respect to the regularity of student progress through the four years of the medical school curriculum, medical schools may be divided into at least two classes—a low degree and a high degree of regularity of progress. In the class characterized by the lesser degree of regularity of student progress (Cluster I), the academic irregularities are significantly related to the students' scores on the MCAT. It appears that the Quantitative Ability section of the MCAT and the average of Verbal Ability and Quantitative Ability are somewhat more discriminating than the other sections with reference to academic irregularity. In the class of school characterized by the greater degree of regularity of student progress (Cluster II), there is no significant relationship between the academic irregularities and the students' scores on the MCAT.

ACKNOWLEDGMENTS

The authors wish to acknowledge with appreciation the excellent cooperation of the administrative personnel of the several schools included in the study. For assistance in assembling the data and making many of the calculations, we are indebted to Mrs. Benjamin S. Patrick, Jr., of The Bowman Gray School of Medicine of Wake Forest College.

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University Surgical Residents' Conference
A Report on a New Concept and the Inaugural Meeting

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The concept of a conference for the senior residents in a given specialty from the university medical centers throughout the country is a new one. The inaugural meeting of the Conference of University Surgical Residents took place on May 7, 8, and 9, 1959, under the sponsorship of the Department of Surgery of the University of Rochester School of Medicine and Dentistry, with 73 residents representing 56 medical centers. The unequivocal success of this initial meeting has led to the establishment of plans for the conference to rotate on an annual basis to major university surgical centers throughout the country. The enthusiasm for its continuance prompts a discussion of this concept and a report of the proceedings of the inaugural conference.

PURPOSE

The purpose for the proposal of "still another meeting" for a specialty which is replete with organizations which meet annually is considered threefold: First, to present before a group of men, who have completed 4–5 years of surgical training, usually in a single institution, the trends of surgical management in other medical centers. Second, to provide the opportunity for the discussion of the problems associated with the residency training of a surgeon. Third, to create an environment for future leaders of surgery to become acquainted with one another at an early stage of their academic development.

Management of clinical problems.—In the realm of surgery a variety of outstanding organizations successfully promulgate surgical knowledge. Under the guidance of the accepted leaders in the field of surgery, clinical concepts and experiences are disseminated from a senior level. The presentations are formal and rightly serve as a firm foundation for the modern practice of surgery. In 1941 the Surgical Forum was established by the American College of Surgeons to offer the opportunity for young men engaged in research on surgical problems to present their work before an audience. The result has been "a rich and varied offering of papers, representing the most original thinking and creative effort in surgery" (1). However, there has been no opportunity for the young man undertaking residency training in surgery to bring forth for discussion the current management of clinical problems practiced in his institution and, more important, to compare these with procedures advocated in other medical centers.

The Halstedian surgical training program, having as its basis increasing responsibility in a single institution, has flourished with obvious success in all our major university centers. However, single institution training with the associated exposure to a limited number of teachers, who more fre-

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quently than not agree with one another, is fertile soil for surgical provincialism. An informal exchange of ideas with men of equivalent experience is a step to a more cosmopolitan and effective approach to medical problems.

Problems of surgical residency.—The senior surgical resident is the individual most totally cognizant of the problems experienced during the residency training program at his parent institution. He has recently encountered these problems and has hoped for their correction. The present surgical resident in the near future becomes a university staff surgeon and in the distant future may become endowed with the responsibility of a residency program. All improvements for the benefit of the residents in training will emanate not from the men in training, but from cognizant and concerned "residents of the past." An open discussion between senior surgical residents provides for the individual resident an acquaintance with other programs and their problems and the solutions which have been proposed or accomplished. The resident gains some satisfaction in the realization that the problems which he has endured have been experienced by others. The represented surgical service benefits when the resident returns with a more panoramic view of problems of residency training and in some instances with suggested solutions.

REPORT OF INITIAL MEETING

Fifty-six medical centers were represented by 73 senior surgical residents. Several schools elected to send more than one representative for a variety of reasons. When the University Surgical Department was responsible for more than one major hospital, the chief resident of each hospital attended the meeting. A few departmental chairmen considered it advantageous to sponsor the present chief resident and the incumbent resident in order to establish a continuity for future meetings. The group was made of men who had completed 4 or 5 years of residency training. Many had already made plans for joining the faculty of a medical school, and several planned to enter practice, but maintain a part-time affiliation with the Department of Surgery of the medical school in their community.

SCIENTIFIC PROGRAM

The scientific program was organized by the surgical staff of the host institution from a series of clinical topics which had been requested from the residents several months prior to the meeting. The subjects submitted represented material in which either the resident himself or his department had recent experience and interest. The program was formulated with six major broad subjects (see Table 1), and those residents whose material was considered of interest and particularly applicable to one of the panels were informed 1–2 months before the meeting which topics had been selected for formal presentation.

TABLE 1

MANAGEMENT OF CLINICAL PROBLEMS

I. Portal Hypertension
II. Peptic Ulcer and Esophagitis
III. Problems of Acute Abdomen and Pancreatitis
IV. Shock and Trauma
V. Peripheral Vascular Disease
VI. Carcinoma and Transplantation

The panels ran consecutively, and each was approximately of 2 hours' duration. The scientific sessions were moderated by members of the surgical staff of the University of Rochester School of Medicine and Dentistry. A series of four to five papers were delivered by the visiting residents at each session, thus affording the opportunity for 28 residents to present their material. These presentations usually were discussions of the current surgical management in the medical centers represented. In some instances, the natural history of the disease in question or diagnostic techniques were emphasized, but most of the papers centered around the philosophy behind the surgical approach advocated and at times a description of technique.

The formal papers, similar in type to presentations at major surgical meetings,

served as a basis for an informal, searching, and at times provocative discussion by the entire group. The moderators served to direct and at times catalyze discussion, but did not offer their opinions. Both the essayists and discussors displayed marked maturity in their advocating a particular approach to controversial medical problems. Sound physiology and thoughtful statistical analysis rather than dogma formed the foundation of all discussion.

PROBLEMS OF SURGICAL RESIDENCY

The attending residents were divided into five groups of fourteen to fifteen, with each panel consisting of resident representatives from all parts of the country, so that each of the simultaneously conducted round-table discussions contained a geographic cross-section.

Major subjects discussed in each group were:

A. The problem of the declining ward patient census
B. The length and components of the residency training program
C. Finances

A. *Problem of declining ward patient census.*—Concomitant with an increase in the insured population through the northern states, there has been a significant decrease in the ward patient census. Although this situation is not prevalent in the southern states at present, it is apparently looming on the horizon. In addition to the increase in percentage of insured population, the establishment of numerous Veterans Administration hospitals and, in several states, the provision for care of the so-called "ward patient" by smaller peripheral hospitals have intensified the problem. There was a unanimity of opinion that this problem has been assuming increasing proportions, and projection into the future dictates the need for present planning to meet the critical situation.

The deficit in ward patients has been and should continue to be corrected in several ways. In certain medical centers, the inclusion of a Veterans Administration hospital has greatly increased the availability of cases for the residents. In other instances, the use of private cases has helped satisfy the need. However, this was considered to be of limited value, since the resident could not have ultimate responsibility. A major increase in the residents' case material could be satisfied by the "unassigned insurance patient," that is, the patient with insurance who enters the hospital without requesting a particular private physician. In many university centers, the "unassigned insurance patient" who presents to the emergency department for surgical therapy is automatically considered a residents' case. Other institutions give the senior surgical resident a service equivalent to the attending men, and the resident is assigned patients in rotation on a basis equivalent to the staff surgeons. In these instances, the senior resident is usually dubbed with the more euphonic title of Instructor in Surgery. It was felt that the problem of the "unassigned insurance patient" must be resolved overtly between the university and the local medical and surgical societies.

B. *Length and components of the residency training program.*—In general, the residency programs have varied between 4 and 5 years subsequent to an internship. The majority considered a 4-year residency program subsequent to internship equitable and sufficient for the training of a general surgeon. In most instances, thoracic training was included under the general title of "general surgery"; however, only a small portion of the residents were qualified in both general and thoracic surgery, and this group was made up of those who spent the additional fifth year in training. The group was of the opinion that the general surgical program should continue to include instruction in the various subspecialties. Some concern was expressed that, with the advent of stronger and more vigorous subspecialties, the general surgeon may be relegated to the role of an intestinal surgeon, and this situation is to avoided. All the surgical programs represented were essentially of the Halstedian

type in which there was a graded responsibility, and there was extreme satisfaction with such a philosophy of surgical training. The role of research in the residency training program was discussed, and it was felt that, although this experience was extremely beneficial in the maturation of some residents, it should not be an obligate component to the residency training program but rather an elective period.

C. *Finances.*—It was impressive that a frank discussion brought out the fact that over 80 per cent of the residents were in significant debt at the termination of their residency. It was proposed that a $400 to $450 per month stipend should be the minimal salary, since this would avoid debt and allow for the maintenance of a necessary term insurance policy program. It was also of interest that many hospitals held the individual resident responsible for his malpractice insurance. This should certainly be provided by the hospital or university. The sources of finances for the residents' salaries were discussed. The expressed opinion was that the university should contribute to the residents' salaries, since they do devote a segment of time to teaching medical students. Hospitals should contribute in view of the services afforded by the residents to the hospitalized patients. Clinical training grants can be used as a final source to augment the income. The question was raised whether the staff surgeons should contribute in view of the service rendered to them by their resident staff, and the response of the group was negative.

SUMMARY

The concept of the conference of senior residents in surgery from university medical centers throughout the country has been discussed and the inaugural meeting of the "Conference of University Surgical Residents" reported. The success of this initial meeting has resulted in enthusiasm for continuance of such a conference on an annual basis, and it is suggested that this concept be applied to other medical specialties.

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Faculty Attitudes toward Experiences with a Revised Program of Medical Education

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In 1952, the School of Medicine at Western Reserve University initiated an experimental program in medical education. The faculty introduced extensive changes in curriculum and teaching methods (2, 4, 6, 7) and also recognized the importance of establishing some means for evaluating whether the new program was achieving the desired results. At the beginning of the program, therefore, a Subcommittee on Evaluation and, later, a Division of Research in Medical Education were established with the responsibility of recommending and conducting appropriate studies in the evaluation of the program (3).

The difficult problems associated with the evaluation of professional education were recognized to include: inadequacies of criteria on which to make judgments, the crudeness of research methods in the assessment of individual or institutional behavior, the complexity of the responses of the individual "medical student," and the enormous number of variables in the process called "medical education." Preliminary studies were made of certain parts of the program, and in student responses over a period of 4 years of the program and after graduation. These observations are continuing (3).

A study of faculty opinion had not been attempted but was considered as one approach to evaluating the program. Faculty opinion had been responsible for the changes made in the program from year to year as strengths and weaknesses appeared. Changes in teaching methods, curriculum, the treatment of the student, and administration appeared to be traceable to faculty opinions and judgments. These opinions had been recorded at numerous faculty meetings, committees, and other groups, but no broad single study of faculty opinion had been made.

Partly to help make explicit this informal body of opinion and partly to conduct a type of program evaluation, a study of faculty opinion was made in the Spring of 1959, toward the end of the seventh year of the program's operation. This survey was conducted as part of the preparation for the Ninth Conference on Medical Education[1] held annually by members of the faculty in June. This conference is designed for the presentation of opinions and experiences with the program that have occurred during the year. A questionnaire on faculty opinion concerning the revised program fitted in well with the agenda and permitted the first faculty-wide assessment of opinion.

The questionnaire investigated three major problems: (*a*) the faculty's image of the kinds of careers it envisions for the gradu-

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[1] The questionnaire was evolved as the joint effort of the Committee on Medical Education and the Division of Research in Medical Education at the School of Medicine. We are especially grateful to Dr. Frederick C. Robbins, Chairman of the Committee on Medical Education, and to Drs. T. Hale Ham and William R. Adams of the Division of Research for their help in the development and administration of the questionnaire.

ates of the School of Medicine; (*b*) its views of the strengths and weaknesses of the program; and (*c*) its views of the behavior of the students in the program.

Questionnaires were administered through the thirteen departments in the School of Medicine including staff members at hospitals associated with the school. Of the 275 questionnaires sent out, 230 (84 per cent) were returned. Of those returned, 78 per cent were from full-time and 22 per cent from part-time staff members. More than half of the respondents had been associated with the Medical School for more than 5 years. Of the respondents 21 per cent were from pre-clinical, whereas 79 per cent were from clinical departments.

This paper presents some of the major findings of this survey. Emphasis is given faculty responses to questions that sample opinions on the program and the behavior of students. These findings are preceded by a brief description of the kinds of physicians the faculty believes should be turned out by this Medical School. The latter material is included to provide perspective for the findings on attitudes toward the program and students.

RESULTS

Careers.—Opinion concerning the kinds of careers envisioned for graduates was approached by a question asking the faculty member to indicate what proportion of each graduating class he should like to see enter five different careers that were believed to cover most of the likely choices of physicians. Results are summarized in Chart 1.

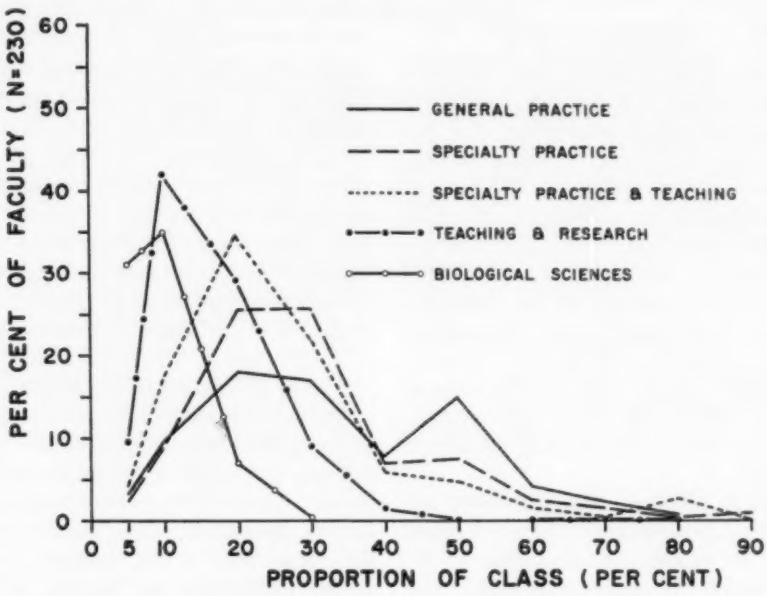

CHART 1.—Faculty responses to question: "What proportion of each class should you like to see enter the careers listed below?"

As might be expected, the faculty favored considerably larger numbers of graduates entering the fields of medical practice than careers in teaching, research, and the biological sciences. However, there was far less agreement concerning the relative numbers of students to enter the field of general practice than specialty practice (alone or in combination with teaching). As shown in Chart 1, the distribution of opinion favoring general practice was notably different than for other careers; the curve is bimodal. The first

peak is a broad one in which from 14 to 17 per cent of the faculty believed that from 20 to 30 per cent of each class should enter general practice. In the second peak, 15 per cent of the faculty believed that 50 per cent of each class should enter general practice. Further analysis of this peak revealed that 28 per cent of the faculty who hold Ph.D. degrees (in the pre-clinical sciences) favored this, whereas only 13 per cent of those with M.D. degrees were of this opinion. Discussion of this point at the conference suggested that there were major differences in understanding of what "general practice" meant. This could have contributed, in large part, to the bimodal distribution of opinion.

The faculty is in relatively good agreement as to the proportion of each class to enter nonpractice areas. More than 80 per cent felt, for example, that 5–20 per cent of each class should enter teaching and research. Sixty-seven per cent wanted 5–10 per cent of a graduating class to follow careers in the biological sciences.

It appears, therefore, that the faculty is most agreed on the relative numbers of graduates it would like to see enter academic and research careers, somewhat less agreed on the proportion of students to enter the specialties, and least agreed on the number of students it wants to follow careers in general practice. The faculty's estimates of those it would like to enter academic and research medicine seem to be rather large in comparison with recent estimates of the proportion of students (6 per cent) in a number of medical schools expecting to pursue careers in teaching and research (1) and with data describing the proportion of active practitioners (3 per cent) who are in these careers (5). Opinions toward the program and the behavior of students, presented below, should be viewed in relation to this emphasis.

The program and student behavior.—One question asked for opinion about the degree of success of the program in preparing students in several areas of performance. These results are presented in Table 1.

TABLE 1

IN YOUR OPINION, TO WHAT EXTENT DOES THE CURRENT PROGRAM SUCCEED IN PREPARING STUDENTS IN THE FOLLOWING AREAS OF *PERFORMANCE* (OR ACHIEVEMENT)?

	PER CENT OF FACULTY (N = 230)			
	Highly successful	Moderately successful	Less than moderately successful	No opinion
Knowledge of biological sciences	18	59	10	13
Knowledge of clinical medicine	6	60	17	17
Self-education	23	60	10	7
Problem solving	9	68	12	11
Patient care	14	47	18	21
Helping the student reach the level of excellence of which he is capable	13	53	19	15

Although it would appear from this table that the faculty views the program as moderately successful in the areas described, the nature of the distribution may be a reflection of form of the question and of error of central tendency so commonly found in opinion ratings. Of a substantial nature, however, is the finding concerning self-education. Faculty opinion that the program had succeeded in preparing students for self-education is one of the major findings of the survey. Success in this area was regarded more unequivocally than in any other area, approximately one-fourth of the faculty members concurring that the program had been *highly successful* in this important regard. One of the major principles guiding the

development of the new program had been the expressed objective to encourage the student and to hold him responsible for his self-education, hoping that this process would be continued for life.

In another attempt to assess faculty opinion of the total program, a question was asked whether the faculty observed any significant differences between students of the present program and those of the former program or students from other medical schools. The free responses were subjected to a content analysis, then divided into six content categories, each one of which was further subdivided as favorable or unfavorable. Sixty-eight per cent of those who returned the questionnaire reported observing differences; 130 (out of 230) described these differences in some detail. These are summarized in Table 2.

It is notable that nearly twice as many responses indicate that present students compare favorably with other groups. Students' attitudes, their relationships with patients (not a single mention was made of an unfavorable comparison in this category), and their approach to medicine were regarded very positively. Favorable and unfavorable responses concerning qualities of students were evenly split, as were the relatively few comments about faculty-student relations.

The only area in which spontaneous comment ran more heavily negative concerned knowledge and skills. The number of responses in this area (N = 27 or about 10 per

TABLE 2

FACULTY DESCRIPTIONS OF DIFFERENCES BETWEEN STUDENTS IN THE REVISED PROGRAM AND FORMER STUDENTS OR STUDENTS IN OTHER MEDICAL SCHOOLS

(130 persons recorded 241 comments)

	FAVORABLE	UNFAVORABLE
A. Attitudes:	60	25

On the favorable side, comments include students' enthusiasm, ability to think independently, to take responsibility, desire to work together, greater enjoyment of school, lowered competitive feelings, and decreased grade-consciousness.

On the unfavorable side, comments include students' indifference, unwillingness to work unless pushed, over-confidence about knowledge, and tendencies toward glibness.

	FAVORABLE	UNFAVORABLE
B. Patient relationships:	34	0

All comments in this area are favorable. They concern two aspects of patient relationships, namely, interest in the "whole" patient and improved ability and maturity in approaching and handling patients.

	FAVORABLE	UNFAVORABLE
C. Approach to medicine:	31	7

Favorable comments on attitudes included the students' readiness to question what was formerly accepted as dogma, to evaluate what they read, an awareness of the importance of research. Also, the student was more seriously concerned with his role as doctor and was generally more thoughtful. Some complimented students on their ability to be concerned with concepts rather than minutiae.

Unfavorable comments concerned over-emphasis on the socio-psychiatric aspects of medicine.

	FAVORABLE	UNFAVORABLE
D. Faculty-student relations:	6	5

Favorable responses suggest that students have benefited from the lowering of faculty-student barriers; they are no longer afraid to approach the faculty with questions or suggestions and feel the faculty is working to help them!

Unfavorable responses suggest that students have abused the lowering of this barrier; they tend to be less respectful to faculty and expect to have too much done for them.

	FAVORABLE	UNFAVORABLE
E. Knowledge and skills:		
Fundamentals, Basic Science and their application	7	27
Clinical Medicine	6	9

	FAVORABLE	UNFAVORABLE
F. Quality of students:	12	12

Favorable qualities included mention of high intellectual ability and general high caliber of student body.

Unfavorable qualities included mediocrity and suggested a high percentage of maladjusted students.

cent of the free responses) corroborated the finding in Table 1, namely, that about 10 per cent of the faculty felt that the program was less than moderately successful in preparing students in knowledge of the biological sciences. Analysis of the negative responses in Table 2 (N = 27) indicated that clinicians predominantly held this view.

Faculty attitudes concerning students' knowledge of clinical medicine bears special mention. In Table 1, it is suggested that, although most of the faculty regarded the program as moderately (60 per cent) or highly (6 per cent) successful in this area, 17 per cent of the faculty felt that it was less than moderately successful. In their spontaneous reactions (Table 2) a few more persons had an unfavorable than a favorable view of students in this area. Thus, it may be said that a relatively small but emphatic segment of the faculty (predominantly clinicians) feel that there is much room for improvement in students' knowledge of clinical medicine. It is not known whether this reaction of the clinicians is limited to the School of Medicine or would be found generally.

An area in which the faculty had shown great interest concerned the development of student attitudes toward critical self-evaluation. One question, therefore, was aimed at opinion regarding the success of the program in preparing students in these attitudes. Responses to this question are presented in Table 3.

It is immediately evident that, though the majority felt the program was moderately successful (errors of central tendency may be suspected again) to highly successful, about one-fourth of the respondents consistently found the program less than moderately successful in this general area. The relatively high percentage of "no opinion" is also noteworthy. It is of particular interest that, although opinion is so strong concerning the success of the program in preparing students in self-education (Table 1), there is considerably weaker opinion of its success in helping students develop critical self-perspectives.

Two questions were directed at faculty opinions concerning strong and weak points in the program itself. In one question, the faculty member was asked to describe the two features of the total program which appeared to him to be the most sound and, in the other, to describe the two features that seemed to him to be the least sound. These results are summarized in Tables 4 and 5.

It is clear that subject committee teaching (correlated, interdepartmental, or integrated teaching, all four referring essentially to the same phenomenon) is outstanding in its acceptance by the faculty as the soundest part of the program. Other parts of the program frequently regarded favorably are: students' work on individual research projects and their early introduction to clinical medicine, faculty attitudes toward the program, student-faculty relations, the continuity concept both as it applies to patient care and to teaching the student, preceptor groups, and student self-responsibility.

Responses concerning parts of the program regarded as weak were more diversified

TABLE 3

IN YOUR OPINION, TO WHAT EXTENT DOES THE CURRENT PROGRAM SUCCEED IN PREPARING STUDENTS IN THE FOLLOWING *ATTITUDE* AREAS?

	PER CENT OF FACULTY			
	Highly successful	Moderately successful	Less than moderately successful	No opinion
Critically evaluating his knowledge and skills	4	56	25	15
Critically evaluating his personal behavior and attitudes	5	50	25	20
Critically evaluating his responsibility for self-education	10	52	24	14
Critically evaluating his choice of a career in medicine	10	42	23	25

and less focused on specific aspects. No part of the program was singled out as clearly for unfavorable comment as was subject committee teaching singled out for favorable comment. It is noteworthy that only 8 per cent of all the spontaneous responses agreed on *one* part of the program as weak (i.e., Family Clinic).

The greatest concentration of weak features in the program seemed to be in these areas: teaching methods, emphases in teaching, evaluating the efficacy of teaching and the need is strongly felt for research in teaching methods. The clinicians especially regarded this as of the highest priority. These findings corroborate those presented in Table 5, where the greatest dissatisfaction with teaching is found in the teaching of clinical subjects.

TABLE 4

RESPONSE TO QUESTION: IN YOUR OPINION, WHAT TWO FEATURES OF THE TOTAL PROGRAM ARE THE *MOST SOUND?* (325 RESPONSES)

I. Teaching emphases:		II. Parts of the program:	
Subject committee teaching	52	Projects	42
Integrated teaching (also described as correlated, coordinated, interdisciplinary, etc.)	51	Preceptor groups	13
Early introduction to clinical medicine and patient care	24	Laboratory work	7
Continuity concept	13	Free time	6
Emphasis on total patient	9	Family Clinic	6
Flexibility, fluidity	6	Basic science	6
Small group teaching	3	Electives	5
	158	Clerkships	4
			100
III. Effect on student:		IV. Effect on faculty:	
Student-faculty relations	14	Continued interest, effort, enthusiasm of faculty	18
Student self-responsibility	12	Teaching improved and made easier	7
Active student participation	6	Interfaculty relations	6
Lack of usual press on student	4		31
	36		

SUMMARY

This paper has presented the highlights of a survey of faculty opinion, based on a questionnaire completed by 230 members of the faculty, toward the revised program of medical education at Western Reserve University after the program had been in operation for 7 years. The survey intended to explore faculty opinion in several areas. It was not intended as a definitive evaluation of faculty judgments concerning the program or student behavior.

Subject committee (or integrated) teaching was regarded as the single most sound part of the program. Among the most favorably regarded parts of the program were: student projects, the early introduction of the student to clinical medicine, the continuity concept in teaching and patient care, the preceptor method of teaching, and faculty-student relations.

the progress of students. Concern over teaching appeared to be confirmed in response to another question in which the faculty was asked to indicate areas needing highest priority for research in education. Clearly, teaching methods were regarded as the major interests for research in education as shown in Table 6.

The faculty emphasis on teaching methods runs through many comments in the questionnaire. There is little question but that a large segment of the faculty feels that strides have been made in many parts of the teaching program (such as the subject committee method of teaching, continuity of contact with students in preceptoral groups and in the student project). Nevertheless,

The program was considered to be most successful in helping students develop habits of self-education, and students were compared favorably (to students in the former program or at comparable medical schools) in patient relationships, in their approach to medicine, and in attitudes toward their work. Especially noteworthy were comments concerning students' interests in and ability to relate to patients, and their capacity to assume responsibility for their education and to maintain enthusiasm for it. Some elements in the faculty considered that the present attitudes and interests of the faculty should be considered one of the sound features of the program.

Responses regarding the weak points of the program were more diversified than those concerning strong parts. They appeared to be more difficult to categorize and were less focused on specific aspects. There was greater agreement concerning the sound parts of the program than the parts considered to be weak. This suggests that the major changes introduced in the revision of the program of medical education have not re-

TABLE 5

RESPONSE TO QUESTION: IN YOUR OPINION, WHAT TWO FEATURES OF THE TOTAL PROGRAM ARE THE *LEAST SOUND?* (317 RESPONSES)

I. Parts of program:		II. Teaching emphases:	
Family Clinic	24	Teaching of clinical medicine	20
Projects	15	Socio-psychiatric emphasis	14
Electives	15	De-emphasis on acquisition of detailed knowledge in favor of "survey-type" knowledge	11
Free time	11	Difficulties in merging basic science and clinical medicine	11
Continuity Clinic	8	Subject committee method	10
Clerkships	6	Teaching of basic sciences	10
Group Clinic	4	Coverage of material	9
Bioclinicals	4		85
	87		

III. Evaluation and examination of student performance:		
Lack or difficulty of evaluation	25	
Examination policy	14	
Student anonymity	6	
Student's not knowing own standing	3	
	48	
IV. Demands on faculty and problems of teaching:		
Great number of instructors required (may reduce caliber)		8
Confusion regarding the whole program		8
Failure to evaluate and ensure "good" teaching		7
Heavy demands on time		6
Too many lectures		3
Failures in motivation and evaluation		3
Difficulties inherent in small group teaching		3
Lack of faculty agreement and cohesion		3
		41
V. Demands on students and problems of students:		
Tolerance of inadequate performance	10	
Emphasis on self-education	9	
Over-valuation of student opinion	5	
Not enough required of the student	5	
Lack of required attendance	4	
Poor student attitude	3	
Poor discipline and lack of faculty authority	3	
	39	
VI. Selection and counseling:		
Admissions, counseling, promotion	10	
Student selection	4	
Admission of immature or disturbed students	3	
	17	

sulted in any unanimity or gross dissatisfaction on the part of the faculty with any single feature in the program.

Among the program weaknesses noted by relatively small segments of the faculty were: methods of examination and evaluation of the program, the teaching of clinical medicine, the use of the Family Clinic, demands on faculty (time and effort), and other problems in teaching.

As regards student performance, there was the feeling that the program has been only moderately successful in helping students develop self-critical perspectives. A small but emphatic group in the faculty believed that students could be much better prepared in basic knowledge and skills, and other small numbers of responses recommended improvements in student attitudes.

TABLE 6

RESPONSE TO QUESTION: WHAT TWO OF THE FOLLOWING SHOULD BE GIVEN THE HIGHEST PRIORITY AS AREAS FOR RESEARCH IN MEDICAL EDUCATION?

AREAS	PER CENT OF FACULTY CHOOSING AREA	
	First	Second
Teaching methods	45	0
Selection of students for admission	32	16
Evaluating student progress or growth	10	20
Clarifying curriculum objectives	7	25
Follow-up studies on performance of graduates	0	18
Study of faculty attitudes toward education of physicians	0	13
Examination methods	2	2

It may be said that the very things which tended to be criticized in the previous program of medical education, such as student competitiveness, anxiety about grades, and disinclination to work well together, appeared to have shifted in the revised program to a point where the faculty found commendable student attitudes toward working together, a noticeable lack of competition, and readiness of the student to assume responsibility for his own education. One of the survey's principal findings concerned the strength of opinion that the program has succeeded in helping students develop adequate methods of self-education. In view of the fact that this was one of the major objectives in the revision of the program, it may be inferred that one of the objectives of the program had been achieved, at least as far as faculty opinion is concerned.

Teaching methods and methods of evaluating student progress were given highest priority as areas in which research was needed. There was a strong interest in maintaining the spirit of inquiry in the teaching and learning process. It appeared from these results that after 7 years of experience with a revised program the faculty was now ready and enthusiastic to apply research methods to teaching itself.

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IN MEMORIAM

Edward Lewis Turner, M.D.

Edward Lewis Turner, M.D.
1900–1960

Edward Lewis Turner, M.D.

Because of his ability to combine knowledge and experience, Dr. Edward Lewis Turner was exceptional in his formulation of reliable judgments. He was also exceptionally sensitive to human need and opportunities for service. The illumination of these qualities by an insatiable curiosity, by the ability to communicate and inspire, by imagination and courage, and by humility and compassion made him at once a scholar, teacher, leader, and servant.

It is this cluster of attributes that carried Dr. Turner from accomplishment to accomplishment: From the laboratories of Dr. A. J. Carlson to the American University of Beirut as a teacher of physiology, to the University of Pennsylvania for his M.D. degree, to the University of Chicago for training in internal medicine, and then back to Beirut as dean and professor of medicine. To Meharry Medical College as professor of medicine and president and thence for a period of private practice in Pennsylvania. To Seattle, where he planned and developed the School of Medicine for the University of Washington. And, finally, to the American Medical Association, where he served several years as secretary of the Council on Medical Education and Hospitals and more recently as director of the Division of Scientific Activities.

It is this cluster of attributes that also made Dr. Turner a source of counsel and comfort to countless young people with ambitions in academic medicine—a role in which he was of particular significance since the retirement and death of Dr. Alan Gregg.

Dr. Turner's career contributed mightily to progress in the teaching of medicine—not only in the nation's schools of medicine but in its hospitals as well. His intimate knowledge of the schools and hospitals as well as of their faculties and staffs and the care and honesty with which he has used this knowledge—always realistic and practical, never compromising principle or excellence—won for him a position of signal respect and effectiveness.

And in these days, when medical science, practice, and education are undergoing radical and rapid change, leadership with *his* kind of effectiveness is sorely needed.

As Dr. Turner moved from assignment to assignment, always leaving his work well done, each time he carried away a great measure of continuing interest and frequently one of continuing responsibility. As a consequence, while his satisfactions of accomplishment were great, his burdens of concern ever grew. And yet he always anticipated the challenges of the future. Not for a moment did he ever consider that his work was done. And this was never more true than the day he died.

Those of us who over the years have shared in Dr. Turner's dreams and accomplishments and also who have become accustomed to the clasp of his hand, the pressure of his shoulder, and the counsel in his voice well know whereof I speak when I say that his place in medicine has come to be unique and one that will always go unfilled.

WARD DARLEY, M.D.
Executive Director, AAMC

MEDICAL EDUCATION FORUM

Editorials

WE HAVE A MESSAGE!

As this Editorial is written, Christian churches are celebrating the message which Christ brought to earth. Across historic lands which recall the time of Christ, President Eisenhower's jet plane carries him to Delhi, Kabul, and Karachi to carry a message of peace by discussion supported by the friendship of the United States. Throughout the centuries, messages borne by great leaders have changed the future of man or have promoted a common concern for resolving major obstacles. Nothing can replace the spoken word as a means of kindling friendships, rallying support, or calming suspicions. We who represent medical education need to kindle friendships, rally support, and calm suspicions. We, too, have a message; yet we do not carry our message to our friends, or even to our potential supporters.

Our message concerns the great contributions that we have made to health and the great opportunities ahead for further contributions. These future contributions, however, require more superior medical students, more excellent faculty, more adequate financial support, and greatly expanded physical facilities.

Our faculties are the first group that should hear our message. How many faculty members are familiar with the recent reports to the Surgeon General? How many Deans are discussing the dwindling supply of good students, the problems of faculty recruitment, and the need for more adequate financial support with their faculties? The lack of faculty understanding of local objectives and national needs is a problem in a majority of our medical schools today.

Our message has been communicated with least effect to another group that most needs to hear it—the medical profession. From ancient times, the practicing physician has assumed a responsibility to support the preparation of his successors. However, in many communities, some of the leaders of medical societies seem more interested in constricting medical schools than in fostering their fullest effectiveness. The hostility of the practicing medical profession appears self-perpetuating. Many physicians seem to feel that their professional responsibilities are to practice medicine and, concomitantly, to oppose the medical schools. Yet to a significant extent this attitude is based upon the aloofness of medical educators. We do not take advantage of opportunities to discuss our problems with our practitioner colleagues.

Alumni organizations have an important role to play in spreading the message of medical education. A strong alumni association can pay rich dividends. The privately endowed schools have been active in developing solid alumni organizations; yet the tax-supported schools, which often have the severest headaches because of organized medicine, have been singularly disinterested in alumni associations.

Industry, too, needs to become more familiar with the message of medical education. In addition, our elected political representatives at municipal, state, and national levels are interested in our message when we give them a chance to hear it.

Medical education is in urgent need of better communication with many groups. Our message must get through!

JOHN Z. BOWERS, M.D.

SMOKE MEANS FIRE!

Have we divided medical education so that the medical schools take responsibility for the undergraduate period while the American Boards are responsible for residency programs? We do not recall such a treaty, yet many people are deeply concerned that this dichotomy has transpired. The Boards have played one of the roles in improving specialty training, yet other groups have shared the stage. The Council on Medical Education and Hospitals and the A.A.M.C. have been leading protagonists, but today many fear that they have been relegated to understudy parts or to the chorus.

There is obviously no easy prescription for the problem. Communication would seem to be a major requirement, and frank discussions between the A.M.A. Council, the A.A.M.C., and the Boards are urgently indicated. So much smoke means some fire, and no one can afford to be burned!

JOHN Z. BOWERS, M.D.

MORE ABOUT APPLICANTS

Medical Schools rise or fall on the quality of their students. There is general concern about the dwindling quality and quantity of medical school applicants. Scholarships, fellowships, shortening the length of medical education, easing admission requirements and intensive recruitment programs have been suggested. The article by Potthoff published in this number of the *Journal* contains valuable reference material on the pool of medical school applicants. It deserves attention and your comments.

JOHN Z. BOWERS, M.D.

Datagrams*

FINANCIAL AID TO MEDICAL STUDENTS

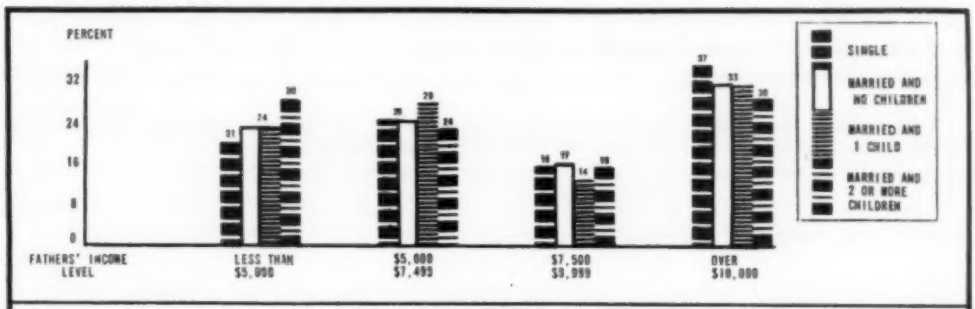
One basic approach to the understanding of medical students' financial standing is to examine the facts concerning student indebtedness. Some recent findings concerning the experience of the 1959 graduating class are summarized below.

MEDICAL STUDENT FINANCES

1.	Number of Students in 1959 Graduating Class	6,799†
2.	Average Cost of Four Years of Medical School to the Students in the 1959 Graduating Class	$ 11,642
3.	Estimated Total Cost of Four Years of Medical School to All Students of 1959 Graduating Class	$80,000,000
4.	Percentage of Students in 1959 Graduating Class Who Have Liabilities from Any Source	52%
5.	Number of Students in 1959 Graduating Class Who Have Loan Liabilities Directly Related to Their Medical Education and Whose Total Liabilities Are Greater than Their Total Assets (Students Who Need Financial Assistance)	2,257
6.	Percentage of Above Type of Students in 1959 Graduating Class	33%
7.	Total Liabilities of This Group of Students	$12,450,786
8.	Total Assets of This Group of Students	$ 2,841,716
9.	Total Indebtedness (Net Liability) of This Group of Students	$ 9,609,070
10.	Average Indebtedness (Net Liability) per Student of This Group of Students	$ 4,258

† Based on report from medical school deans at time of data collection for the study on medical student finances.

A second factor bearing on the medical student's financial standing is his ability to pay for a medical education. This ability derives largely from the level of his father's income and the degree of financial responsibility he currently bears for his family's welfare. The data on these issues are presented in the following figure.



COMPARISON OF MEDICAL STUDENTS' FATHERS' INCOME
BY MARITAL STATUS OF MEDICAL STUDENT
(N = 4,220)
GRADUATING CLASS 1959

* Submitted by the Division of Operational Studies of the A.A.M.C. Source of information will be furnished on request.

The question of what method shall be used to give financial aid to medical students is a complex one. This issue must be studied in terms of the degree of responsibility which should be shouldered by the individual for his own education and the degree of responsibility which should be shouldered by the society which benefits from medical practice. The 1957 Report of the President's Committee on Education Beyond High School cites the following statement concerning these issues:

"Some hold that, because the individual gains from education, and because education beyond high school is voluntary, it is the responsibility of the individual to pay for the services he gets. Others hold that society should provide free educational opportunities to individuals for as long as they are using them advantageously, because society cannot survive and prosper without an educated citizenry. Neither point of view has persuaded a majority of our citizens."

If society aided the medical student from the first point of view, it would do so by *granting loans* which would be repaid to the grantor. Aid to medical students from the second point of view would be derived from *non-refundable grants or scholarships*. A proper balance should be found between these two methods.

The medical student himself constitutes one source of opinion in respect to the balance between these methods of financial aid. Data on the 1959 graduating class of medical students point to the fact that the students favor a 50-50 division between loans and scholarships as a basis of financial aid. Given this proposition, excluding the scholarships that have regularly been available, what are the dimensions of the additional help needed by the medical students?* The table below represents an estimate of the answer to this question based on the experience and the opinion of the 1959 graduating class.

SUMMARY INFORMATION

1. Total Indebtedness of Members of 1959 Graduating Class Who Have Loan Liabilities and Whose Total Liabilities Are Greater than Their Total Assets	$9,609,070
2. Estimate of Average Indebtedness of These Students per Medical School Year If Indebtedness Were Evenly Distributed Over Four Years	$2,400,000
3. Estimated Cost of Financial Aid per Medical School Year If Enough Scholarships Are Provided To Decrease Debt of These Students by 50 Per Cent	$1,200,000
4. Estimated Total Amount of Additional Scholarships per Year for All Four Classes in Medical School	$4,800,000

* Approximate total amount of scholarship aid received by the 1959 graduating students: $2.88 million. (If evenly distributed over the four years: $720,000 per year for this class.)

Report

SOME RECENT CHANGES IN THE UNDERGRADUATE DERMATOLOGY TEACHING PROGRAM

LEON GOLDMAN, M.D.*

In common with the other minor specialties in Medicine, dermatology has had to revise some of its time-honored cumbersome teaching programs. Dermatologic teaching in the past, either in the few hours usually provided or in the rare detailed programs, was oriented essentially to pictorial morphology. Therapy was considered briefly, if at all. It was not considered "good form" to tell all. The public health aspects, unfortunately, even in syphilology, were mentioned very briefly if at all.

Associated with changes in the modern medical curriculum of the basic divisions of Medicine, there have been concurrent changes in the teaching of the specialties. The appointment of more full-time professors of dermatology, the gradual development of interdepartmental cooperation, all these have helped to bring about better teaching programs.

In brief, the background of these changes for dermatology are:

1. The emphasis of modern dermatology on the dynamic phases of the development of the skin lesion. This is, of course, a tired and abused phrase, but it is appropriate to the progress of modern dermatology with the emphasis now on cutaneous physiology, of "living" pathology, and the newer concept of principles of topical and general therapy.

2. The increasing awareness of teaching as applied to the patient as a complete individual and not to an isolated lesion.

3. The increasing awareness of changes in medical practice as relates to emphasis on preventive dermatology, especially as regards public health medicine and the important industrial medicine, on geriatric dermatology, and increasing importance of psychosomatic dermatology.

4. The recognition that good teaching in the medical specialties means the use of direct patient demonstration-conference type rather than the use of crowded didactic lecture with its countless colored lantern slides.

5. The increasing awareness of cooperative teaching programs with other divisions of Medicine.

6. The increasing need for adequate time in the already crowded medical curriculum; time in the early years as well as in the later clinical years. Whether the dermatologist can secure such time in the no-give and all-take of the faculty curriculum committee is another question.

The re-orientation of the dermatologic teaching program has been considered in many dermatology meetings by those interested in teaching. These symposia have been held at the American Academy of Dermatology and at the American Dermatological Association

* Professor of Dermatology, College of Medicine of the University of Cincinnati.

Meeting. Some of these pioneers are: Cipollaro, Osborne, Senear, Sulzberger, Pillsbury, Williams, Alden, Lobitz, and others (1-6).

Undergraduate dermatologic training can begin in the freshman year with actual demonstration of normal living skin under the stereobinocular skin microscope, the Dermatoscope. Then the freshman can select one of a group whose skin has been observed under the microscope for small punch biopsy. This biopsy can be studied in histopathology.

In the sophomore year there is correlation with Pathology and Bacteriology, with clinical presentations given as conferences before the respective presentation in Pathology or Bacteriology. In the sophomore year also, in physical diagnosis the subject of the examination of the skin can be presented at a conference. Then the class is divided into small groups, with an instructor for each group. These classes are held about the bedside of the patients on the Dermatology Service, and the physical diagnosis demonstrated at the bedside.

In the Junior year, conferences in Dermatology and Syphilology are presented with as much patient demonstration as possible. We have preferred the oral examination, since this gives an additional opportunity to attempt to explain the dynamic background of dermatology.

In the senior year the student, under supervision, meets the patient in the Out-Patient Dispensary and also continues the conference type of presentation of the patient who has been seen in the clinic. It is the senior, also, who presents bedside clinics of the in-patient on the Dermatology Service with the complicated background of internal medicine, allergy, psychosomatic medicine, etc.

Into this detailed program, then, for the undergraduates, the modern phases of dynamic dermatology can be incorporated. These new features of dermatology include preventive dermatology, industrial dermatology, geriatric dermatology, and psychosomatic dermatology.

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ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

ANGELA SANCHEZ-BARBUDO, PH.D.
Abstract Editor

Chaire de Clinique Médico-Sociale du Diabète Sucré et de Malades de la Nutrition (Chair of Medico-Social Clinic for Diabetes Mellitus and Nutritional Diseases). Inaugural Lecture by PROF. MAURICE DÉROT (Faculty of Medicine, Paris), La Presse Medicale, No. 42, pp. 1571–74 (Sept. 12) 1959.

After having honored the memory of his own medical teachers (among them the famed Francis Rathery, of whom a few amusing ancedotes are told), the new titular of the Chair discusses some of the problems involved in the emergency treatment of diabetic coma. The importance of a close contact between family and hospital physicians is emphasized as the best means to shorten hospitalization. In Prof. Dérot's opinion, the function of the hospital ward in diabetes cases is that of diagnosis, emergency treatment, and the working out of management and therapy directions. As to the scientific aspects of diabetes, he voices the hope that enzymatic chemistry will eventually bring the solution to the as yet numerous problems raised by diabetes mellitus and nutritional diseases. From the social point of view, the fight against diabetes (from which disease half a million people in France are suffering) must be oriented toward preventive medicine. Especially important is early diagnosis of the diabetic and, better still, of the *pre-diabetic* stages. A decisive step in this direction would be taken by carrying out the project, elaborated (within the frame of the *Office Permanent d'Hygiène Sociale*) by Prof. Dérot and his collaborators: a nation-wide census of diabetic patients. This would allow one not only to detect predisposed families but also to carry on among them efficient propaganda for prevention. Outpatient wards are considered also essential for the early detection of diabetes and pre-diabetes patients, and, such wards having been abolished some time ago in French hospitals, their re-establishment as a gratuitous service is urgently advocated. The last part of this inaugural lecture is addressed to the students to whom Prof. Dérot gives some advice concerning the problem of adaptation to modern medicine (which, he points out, is only one of the various aspects of the universal conflict between technics and civilization). Three main dangers are seen to be threatening medicine today: (1) the danger of becoming *over-scientific* (neglecting clinical investigation for the benefit of the biological methods); (2) *over-specialization;* and (3) the danger of losing the human touch by concentrating on the disease and forgetting the patient.

Doctor as Priest and Artist. The Rev. H. C. WHITLEY, Ph.D., S.S. Supplement to the British Medical Journal, pp. 113–15 (Oct. 10), 1959.

In this paper (sermon preached in St. Gile's Cathedral, Edinburgh, July 19, 1959, before the joint annual meeting of the British and the Canadian Medical Association) the *leitmotiv* is a passage from the Bible: "The doctor's task is of divine appointment, thou hast need of him: let him be ever at thy side" (Ecclesiasticus 38 : 12). Childhood reminiscences and his experiences as a young minister cooperating closely with the powerful parish physician serve to illus-

trate the truth of the Scripture quotation. Is the doctor today fulfilling the same need? the Rev. Whitley asks, is he still as accessible as in the past and is his calling still accepted as of divine appointment? The last 20 years have seen such a staggering transformation in almost every field of medicine that the parable of the "Good Samaritan" will perhaps be considered just an "old-fashioned piece of Scripture" unsuitable for an occasion such as this meeting, and in doubtful taste, since it has been said that today *the Good Samaritan is nationalized:* the place of oil and wine is taken by subsidized medicine; the donkey is now the ambulance; the inn is the hospital, and the two-pence the sickness and disablement benefit (cynics might add that the priest—the aloof scientist—and the levite—the civil service doctor—have come into their own again). It can be argued that today's doctor is not as powerful, significant, or unique as he once used to be (people know more about sickness and health than ever before); it has also been said that the old personal and family relationship is on the way out and that "the team" is taking over, the old responsibility disappearing too (every doctor has now an "escape hatch" in the hospital consultants who make the decisions for him). As to the "Art of Medicine," often referred to in the old oaths of the profession (such as the one the students of the Edinburgh Medical School are required to take) the question arises whether it also is on the way out and should now be called the "Science of Medicine"? (this is the contention set forth in A. Guirdham's *The Theory of Disease*, London, 1957). However, the Rev. Whitley, contrary to these dire predictions, is confident that the doctor is again on the way to becoming the most influential, significant, and necessary member of the community. While the role of the scientist comes more and more under suspicion (as the one whose hand can trigger off the total destruction of mankind), while the theologian becomes more and more out of touch with reality, the man who is committed to preserve life will come into his own *as priest and as artist.* Already, the Rev. Whitley argues, he has moved a long way into the sphere of the priest since not only bodily ailments but the troubles of the mind and spirit are brought to him. By a series of events, discoveries, and "near miracles," the doctor is, furthermore, being driven to practice an *art*, and not simply the art of healing, but the art of "health making" and "health preserving." All this also means a revolution in thinking and outlook and could well lead to an exploration far outside the limits of accepted professional training. If the physician's task is, as the Scripture says, of divine appointment, then the doctor as priest and as artist is the full summation of his calling.

La Enseñanza de la Anestesiologia en la Republica Argentina (The Teaching of Anesthesiology in Argentina). FAUSTO J. MOLINA, M.D. La Prensa Médica Argentina, Vol. 46, No. 2, pp. 130–32 (Jan.), 1959.

Medical educators in Argentina have long been concerned over certain serious deficiencies in the teaching of medicine. Largely due to economic and organizational factors (overcrowded and understaffed schools, inadequate locales and equipment, anachronical examination systems, etc.) these conditions have weakened undergraduate as well as graduate medical training. The teaching of anesthesiology has been affected too, with the result that "autodidactism" in this specialty reigns, not without peril for the patients (any newly qualified doctor in Argentina is allowed to practice anesthesiology without any special training). Although there are quite a few good practical anesthesists, well trained anesthesiologists are very rare. Deficiencies in the anesthesiology teaching also show up, it is pointed out, in the scarceness and poor quality of Argentine scientific publications in that field. To those who want to enter it as specialists, two roads have been open so far: (1) instruction through the Argentine Association of Anesthesiology (Asociación

Argentina de Anestesiología), or (2) by attending the postgraduate courses sponsored by the Faculties of Medicine of Buenos Aires, La Plata, or Córdoba. In the first case, the training offered is eminently practical (the preceptor system prevails) and limited to certain aspects of the specialty. However, the author thinks it is still better than the second type of instruction, which, suffering from the already mentioned deficiencies in staff and laboratory set-ups, results in equally weak practical and theoretical training. To remedy the situation, and to stem the dangerous practice of autodidactism in that specialty, the Association of Anesthesiology is actually engaged in a campaign for the introduction of specialty *boards* similar to those existing in U.S. and Britain.

The Evolution of Neurology. H. HOUSTON MERRITT, M.D. Bulletin of the New York Academy of Medicine, Vol. 35, No. 11, pp. 730–33.

The author (chairman of the Department of Neurology at Columbia University) points out that progress in neurology lagged behind other branches of medicine because knowledge about form and function of the nervous system was slower to develop. In 1840, James Hope could still lament the fact that "the diseases of the brain are, at the present moment, more obscure than any great class in the nosology," and, while knowledge on the heart and lungs did advance rapidly with the help of the physical signs derived from auscultation, percussion, etc., no such physical signs were then applicable to the brain. James Hope, doubting the possibility of their discovery in the future, did not foresee the latter development of tendon reflexes, planter responses, and other now well known signs of dysfunction of the cerebellum. Adequate examination of the nervous system did not become possible until the form of the central nervous system had been described accurately and the function of its various parts had been elucidated by surgical ablations, electrical stimulation, and the pathologic study of experiments of nature. The development of the physiology of the central nervous system paralleled to a great extent the growth of knowledge in anatomy, but significant progress was not made in the former until the 19th century studies of Bell, Muller, Weber, Du Bois-Raymond, Dalton, Jackson *et al.*, culminating in the modern neurophysiology as represented by the work of Sir Charles S. Sherrington. With this background, neurology began to emerge as a clinical specialty in the second half of the past century (thanks to scientists such as Charcot, Babinsky, Oppenheim, Erb, Gowers, Kinnier Wilson, etc.). American neurology had its start in the period of the Civil War, when W. A. Hammond, Surgeon General, created a special military hospital for nervous diseases in Philadelphia, in 1862 (he is also the author of the first treatise, in English, on nervous diseases). The first independent chair in neurology was established in 1876 at the University of Pennsylvania. Neuropathology, although studied in the 17th and 18th centuries, did not come of age until the first part of the 20th (thanks to the contributions made by Germans such as Alzheimer, Bielschovsky, Jacob, Nissl, etc.; Ramón y Cajal and Pío del Río Hortega in Spain; Marchiafava and Mingazzini in Italy; Cruveilhier in France; Greenfield in England, Globus and Hassin in the U.S., etc.) At the present time, more than half of all medical schools in the U.S. have independent departments of neurology (or specialized sub-departments). The membership of the American Neurological Association has grown from 35 in 1875 to 400 in 1958, while the recently founded American Academy of Neurology has more than 2,000 members. The trend in modern clinical neurology is veering away from the minutiae of the neurological examination toward a broader study of the patient. While anatomy, physiology, and pathology have laid the groundwork, biochemistry is actually the field which offers the greatest promise for future advances.

Making Sense. RICHARD ASHER, M.D. The Lancet, Vol. II, No. 7099, pp. 359–65 (Sept. 19) 1959 (London).

The author contends that the meaning of words has a profound effect on the progress of medicine. Although, he argues, it would be pleasant to believe that the facts of clinical medicine exist quite independently from the names bestowed upon them, the truth is, that clinical medicine must not only find words to fit the facts, but often find facts to fit the words. The bestowal of a name upon a concept, whether real or imaginary, brings it into clinical existence (as a good example for such a "creation" the term *gallstone colic* is cited). Similarly, a condition without a descriptive term has far less chance of clinical recognition (example: the common experience of a very brief, sharp needle-like pain near the apex of the heart which seems to come out of the blue and pass as quickly, and which, having no name, has no clinical existence). The naming of diseases, the author warns, should not be undertaken lightly, because, while a fertile medical author can easily beget a large clinical progeny, "some of his youngsters may turn out to be illegitimate, and with others there may be doubt about their paternity." A special kind of "disease-naming" is done by certain branches of industry, whose sales depend largely on the planned creation of nonexistent diseases (like "tired blood" or "hidden hunger"). The significance of words to patients, on the other hand, is a subject on which, it is suggested, "systematic research could gainfully be pursued" (example: *arthritis*, for the patient, may portend a protracted and crippling disease whereas *rheumatism* means only "a few aspirins, a bottle of liniment, and back to work next week"). Although names can give comfort as often as despair, and convey a certain tangibility to illness which makes it more likely to be overcome, it is essential, the author believes, to be aware of the defects and limitations of the medical vocabulary. Stressed is also the importance of "keeping words undamaged by handling them carefully and putting them in the right place only" because once misused they are spoilt for ever (*hemiplegia* and *hemiparesis*, for instance, have been used so carelessly that their important distinction between complete paralysis and weakness can no longer be preserved). Where then is the true meaning of a word: in the dictionary definition or in its usage? There is no answer to this question, the author says, since all depends on what is meant by *the true meaning* of a word. Worse than "mishandling" a word is, in his eyes, the "semantic crime" of *knowingly* applying a single term to two completely different things. This leads him to the discussion, illustrated by numerous examples, of the difficulties caused by "conjectural christening," that is, the naming of a thing by its supposed cause instead of by observed facts. Other troubles arising from words are demonstrated by the deceptive but convenient term *mind* which, having been named like a thing (in reality "mind" has no more existence than has "hearing" or "sight" and is composed by hundreds of different processes) is wrongly treated like a thing, and attempts are even made to partition it into cubicles (e.g. "the Ego, the Super Ego and the Id"). Verbal ambiguity, often so subtle that many are unaware of its influence, is seen as another source of confusion (for instance, the sentence "he feels cold" could either mean the person feels cold to touch or the person perceives cold; failure to distinguish between the two meanings may lead to dangerously wrong treatment). Finally discussed in this paper is the problem of medical *style*, about which the author feels very strongly. Good style for him means writing what one has to say "in the neatest and most palatable form." Long words and esoteric terms should be avoided in scientific writing, except when they convey more than their shorter equivalents. He especially warns against the use of that new kind of jargon created by officialdom and committees with its "malignant hypertrophy of language."

Tuberculosis in Medical Students at the University of Maryland. JAMES R. KARNS. The American Review of Tuberculosis and Pulmonary Diseases, Vol. 79, No. 6, pp. 746–54 (June), 1959.

A tuberculosis control program, started in September, 1934, has been carried out by the Student Health Service of the University of Maryland School of Medicine for 23 years (to June, 1957). This report discusses the findings obtained during this period in regard to trend of tuberculosis sensitivity and attack rate of clinical tuberculosis of students while in medical school. More than 90 per cent of the students were tuberculin-tested, and all had roentgenograms on entrance to school. However, only those who were observed for at least 1 year were included in the study. Results of the survey showed that, of the 2,302 students observed, seventeen had developed clinically significant tuberculosis while in school, sixteen of them during the period from 1934 to 1950, whereas only one case occurred after that date, indicating a striking decline of the disease among medical students in the last decade. This recent low morbidity, it is stated, has occurred without the use of BCG vaccination and is considered the effect of early diagnosis and management and improved methods of treatment of tuberculosis as a contagious disease. Vollmer's test was positive in all cases of clinically proved tuberculosis at the time of the diagnosis, and in a group of 53 students the patch test was found to be as accurate as the first-strength purified protein derivative (PPD). No conclusions regarding severity of the disease in relation to initial tuberculin status can be drawn from the present study, since observation limited to the school years cannot present an accurate history of so chronic a disease. Furthermore, since the number of cases is too small, no significant impressions can be derived. During the period of observation no significant difference was found in severity of disease in relation to entrance tuberculin. Also emphasized in this survey is the fact that medical students, being more exposed, still run a greater risk of tuberculosis infection than any other student group and that continued vigilance is therefore necessary.

What They Did Afterwards. A Survey of Manchester Medical Graduates. G. HOWITT, M.D. The Lancet, Vol. II, No. 7096, pp. 207–8. (Aug. 29), 1959.

This paper describes an attempt to investigate what proportion of medical graduates entered the different branches of medicine and achieved eminence and what relation their record as students bears to their postgraduate career. From the University of Manchester *Calendars* of 1920–1945, the names of graduates in medicine were extracted, as well as any distinctions, honors, or prizes awarded to them; then these names were looked up in the 1958 *Medical Directory*, and their positions, postgraduate degrees, diplomas, and addresses were noted (women graduates, too difficult to trace because of frequent name changes through marriage, were excluded from this investigation). Of a total of 889 names drawn from the *University Calendars*, 112 (13 per cent) could not be found in the 1958 *Directory* (it has been assumed that most of them have died). Of the 777 who could be located, only 39 per cent had entered general practice (contradicting a current assumption that the great majority of British medical students become general practitioners); 13 per cent are now consultants in various branches of internal medicine, 14 per cent in surgery; 4 per cent are consultant pathologists, 3 per cent obstetricians; there are slightly less anaesthetists and still fewer (about 2 per cent) radiologists. Furthermore, among the 777 graduates, ten were found to be anatomists and one a physiologist; nine chose a career in the Services, 69 entered Public Health, and 55 settled overseas. Only twelve are University professors in the various branches of medical science. In his comments on the results of this in-

vestigation, Dr. Howitt states that he has not been able "to determine that students with certain qualifications later took up any particular line." This point is important because of the prevailing tendency to select medical graduates for posts—especially research positions—depending largely on the quality of their academic careers and the assessment by their teachers. Although there is no doubt in his mind that academic distinction as a student predisposes to subsequent success, success in a career, he points out, depends also on many other factors, such as being in the right place at the right time, and with the necessary qualifications. Apart from academic distinction, the candidate for a position must often be selected on a personal assessment of qualities which cannot be measured in any precise, objective way.

NEW BOOKS

KENNETH E. PENROD
Book Review Editor

Abstracts

The Emergency Syndromes in Pediatric Practice. By ALFRED J. VIGNEC. New York: Landsberger Medical Books, Inc., 1959. 371 pp. $9.00.

This book is intended primarily to assist the physician who, in his day-to-day practice, encounters problems in infants and children that require immediate attention. Since it sometimes happens that, faced with acutely ill children, the physician finds himself in a situation where he is actively treating and at the same time trying to make a diagnosis, the author has attempted to confine his discussion to illnesses or disease syndromes that will not brook delay in management. This is not a complete textbook containing every possible disease syndrome, nor is it a first-aid book. For the most part the emphasis is on diseases which are apt to be seen by a busy practitioner. Some of the more rare conditions, such as diseases of the blood, have been included but largely because they confuse the picture of the more common diseases and without some understanding they are liable to lead to errors in treatment. The author has purposely tried to omit conditions which grant the physician "the grace of time." The sections of the book are The Respiratory Tract, The Cardiovascular System, The GI Tract, The Hematopoietic System, Central Nervous System, Metabolic Disorders, the Steroids, Poisons, The Prematures, and Allergy.

Symposium on Basic Research. Edited by DAEL WOLFLE. Sponsored by The National Academy of Sciences, The American Association for the Advancement of Science, and The Alfred P. Sloan Foundation. Washington, D.C.: Publication No. 56 of the American Association for the Advancement of Science. 280 pp. $3.00 ($2.50 to AAAS members).

The idea for holding this discussion of the support of basic research was born within the Alfred P. Sloan Foundation. The symposium was conceived as a nation-wide participation of academic, industrial, and government scientists; of administrators responsible for research activities in universities, colleges, private research institutes, government, and industry; and of individuals who are at the decision level with respect to general policies concerning scientific research. The National Academy of Sciences and the American Association for the Advancement of Science were approached and both enthusiastically agreed to join the Sloan Foundation in the sponsorship of the meeting. The financial support was furnished by the Sloan Foundation. The symposium was held at the Caspary Auditorium of the Rockefeller Institute on May 14–16, 1959.

Observations on Direct Analysis. The Therapeutic Technique of Dr. John N. Rosen. By MORRIS W. BRODY. New York: Vantage Press, 1959. 104 pp. $2.95.

Since 1957 the Institute for Direct Analysis at Temple University Medical Center has conducted research on direct analysis, a method in the psychotherapy of schizophrenia pioneered by Dr. John N. Rosen. One of the research methods used has been a Seminar that has been held weekly since the Institute's inception. The first leader of this particular Seminar was Dr. Morris W. Brody. The Seminar has been made up of of four psychiatrists, including Dr. Rosen, and at least ten to fifteen observers first observing, then discussing and defining, what was occurring in treatment sessions. This book is the first objective description of a revolutionary—and controversial—technique written by an "outsider" who is a psychoanalyst but does not himself practice Direct Analysis.

The Heinz Handbook of Nutrition. Edited by BENJAMIN T. BURTON with an Editorial Board of six recognized authorities. New York: McGraw-Hill Book Co., Inc., 1959. 425 pp. $5.75.

This book is conceived as a comprehensive treatise on nutrition in health and disease. It is published for the H. J. Heinz Company as a practical reference manual and textbook on human nutrition for physicians, nutritionists, dieticians, nurses, and home economists. The subject matter ranges from the basic physiology and biochemistry of food intake and utilization to the psychology of appetite; from infant nutrition to post-operative diets; and from fluid therapy or the etiology of celiac disease to food allergy. The various chapters cover a variety of subjects from diet in gall bladder disease to the relationship between nutrition and degenerative diseases; from the biochemistry of essential nutrients and their metabolic interrelationships to disaster-feeding, food toxicology, or public health nutrition. Particular attention is paid to the therapeutic and preventive aspects of nutrition in the management of specific diseases—including detailed outlines and sample menus for all accepted therapeutic diets.

The Acute Medical Syndromes and Emergencies. By ALBERT SALISBURY HYMAN with five collaborators. New York: Landsberger Medical Books, Inc., 1959. 427 pp. $8.75.

The subject matter of this book was allocated in accordance with the results of a nation-wide poll in which physicians in active practice were asked to list the type of important acute medical problems which they had been called upon to treat in the previous 5 years. Concerning three general groups there was an astonishing agreement: these were cardiovascular, gastrointestinal, and pulmonary in the order named. These constitute the first three parts of the book and were done by Dr. Hyman, Dr. Samuel Weiss, and Dr. G. G. Ornstein, in that order. There was somewhat less agreement concerning the next three groups of diseases, but these were Diabetic Emergencies, by Howard F. Root; the Renal Crises by Anna R. Spiegelman; and Barbiturate Intoxication by Dr. Jack Abry. Although an intense effort was put forth to keep the volume as concise as possible, nevertheless a free discussion of the common problems involved in diagnosis and treatment makes the book useful.

Symposium on Glaucoma. Edited by WILLIAM B. CLARK with eight contributors. St. Louis: The C. V. Mosby Co., 1959. 300 pp. $13.50.

The material for this book was prepared for the 1957 session of the New Orleans Academy of Ophthalmology. It concerns the history, pathology, anatomy, biochemistry, diagnosis, and treatment of glaucoma. The contributors are outstanding researchers and teachers, and all are practicing ophthalmologists. Their presentations cover the latest concepts of the disease of glaucoma and the most modern techniques of its management. The last 66 pages of this volume are devoted to the round-table discussions which concluded each day's session.

Chronic Illness in a Rural Area. Vol. III of *Chronic Illness in the United States*. Reported by RAY E. TRUSSELL and JACK ELINSON. A Commonwealth Fund Book. Cambridge: Harvard University Press, 1959. 420 pp. $7.50.

This volume completes a series of four reports on the problems of chronic illness in the United States, published under the sponsorship of the Commission on Chronic Illness. The subjects and dates of publication of the report are: Prevention of Chronic Illness (Vol. 1, 1957); Care of the Long-Term Patient (Vol. 2, 1956); Chronic Illness in a Rural Area, Hunterdon County, New Jersey (Vol. 3, 1959); and Chronic Illness in a Large City; Baltimore, Maryland (Vol. 4, 1957). The first two reports reflect the work of the two national conferences convened by the Commission. The last two are the result of surveys to gather basic information on chronic illness in an urban and in a rural community. A full account of the purpose and philosophy of these surveys has been given in Volume 4. This study and its companion urban study (Vol. 4) deserve the close scrutiny of all persons concerned with the community problems of chronic illness, which are a major part of public health and medical care. These reports comprise the most thorough and definitive body of information now available on the dimensions of chronic disease illness and disability in representative samples of two population groups. Many of the results are startling.

Physiology of the Eye—Clinical Application. By FRANCIS HEED ADLER. 3d ed. St. Louis: The C. V. Mosby Co., 1959. 780 pp. $16.00.

This book is conceived as offering to the student and the practicing ophthalmologist the recent findings of the physiology of the eye gleaned from the experimental laboratory and

their clinical application. In the third edition much new material has been added. An attempt has been made to clarify parts of the previous edition and to eliminate details which proved to be of little clinical value. In addition to a thorough revision of the chapters of aqueous humor and intraocular pressure the section on the ocular muscles has been entirely rewritten, with the incorporation of the recent work on electromyography. Binocular vision was given too scant attention in the previous editions, and this has been considerably enlarged. Throughout, the recent advances in the physiology of the eye found in both clinical journals and in those of the basic sciences not readily available to many ophthalmologists have been incorporated.

Education for Child Rearing. By ORVILLE G. BRIM, JR. New York: Russell Sage Foundation, 1959. 349 pp. $5.00.

This project was jointly sponsored by the Child Study Association of America and the Russell Sage Foundation. The study was directed to the field of parent education from the point of view of social science. This book is written primarily for practitioners in parent education, but it does have significance for child development research workers and sociologists concerned with the family. There is much similarity between the problems in parent education and those in other preventive mental health programs. This applies likewise to the whole range of activities directed to child guidance, marriage, and family counseling, the development of community competence to handle such problems as juvenile delinquency, and many other similar activities. The present report points to the possibility that the future may well see a concerted attack on common problems of theory and method.

Manual of Skin Diseases. By GORDON C. SAUER. Philadelphia: J. B. Lippincott Co., 1959. 269 pp., 151 illustrations. $9.75.

This book was written in response to demand for a good short book on dermatology. The book is amply illustrated and emphasizes the material which students and general practitioners must know for diagnosis and treatment of common skin diseases. It is divided into two parts. The first section contains chapters on diagnosis and management. The salient points of each disease are outlined, and primary and secondary lesions, distribution, general course, prognosis, etc., are contained in a simplified fashion. Each discussion ends with remarks on differential diagnosis and treatment. The second part is a Dictionary-Index to the entire field of dermatology, including most of the rare diseases and unusual dermatologic terms. This arrangement permits the first section to be unencumbered by the rare diseases, and provides a comprehensive directory to all dermatology for the more interested student or practitioner.

The American Academy of Orthopaedic Surgeons Instructional Course Lectures, Vol. 16. Edited by FRED C. REYNOLDS. St. Louis: The C. V. Mosby Co., 1959. 323 pp. $16.00.

The 1959 instructional course program consisted of 124 courses presented by 181 instructors and was attended by 1700 physicians. The subject matter of this volume is gathered from the various instructors who contributed to the program but has been restricted and does not contain all the papers available for publication. The contents of this volume are divided into seven parts as follows: Symposium on Injuries to Athletes, The Hand, The Foot, The Knee, The Spine, Unequal Extremeties, and Fractures.

Directory of the Medical Library Association. 2d ed. HENRIETTA T. PERKINS, Chairman, Directory Committee. Hamden, Connecticut: The Shoe String Press, Inc., 1959. 274 pp. $7.00.

The first edition of the Directory of the Medical Library Association was published in 1950. It contained information about 360 member libraries. Since that time there have been many changes affecting both number and character of the libraries. The present volume contains information about libraries in the United States, Canada, and member libraries abroad. The arrangement of the 552 institutional members is geographical, with libraries entered alphabetically, first under state and then under city. Information is recorded as sent to the committee, although at times it is obviously incomplete despite repeated requests. Material is registered in the following form: name of medical library, address, telephone number, key number, year founded, source of support, annual budget, name of librarian, name of associate or assistant librarian, number of volumes, pamphlets, cur-

rent periodicals, annual circulation, inter-library loan privileges, classification system, and special collections.

The Evolution of Man's Capacity for Culture. Arranged by J. N. SPUHLER. Detroit: Wayne State University Press, 1959. 79 pp. $3.50.

The six essays presented in this book were delivered at the Plenary Session of the 56th annual meeting of the American Anthropological Association, Chicago, December 29, 1957, in a symposium entitled "The Evolution of Man's Capacity for Culture" and were first published in the February, 1959, issue of Human Biology." The titles of the six essays are "Somatic Paths to Culture," "Brains and Behavior," "Speculation on the Interrelations of the History of Tools and Biological Evolution," "Animal Languages and Human Language," "Basic Social Capacity of Primates," "The Social Life of Monkeys, Apes and Primitive Man."

The Preparation of Medical Literature. By LOUISE MONTGOMERY CROSS. Philadelphia: J. B. Lippincott Co., 1959. 441 pp. $10.00.

The purpose of this book is to present in convenient form the practical techniques of preparing medical literature for publication in journal or book form. The book is concerned strictly with techniques, not with literary criticism. The techniques presented in this book are, as far as possible, representative of generally accepted procedures rather than of the personal preferences of any individual, writer, or publisher. Where differences of opinion or preferences are likely to occur, these differences are pointed out. The book is planned to meet the needs of any author of any degree of experience or skill in writing. Whereas the book is planned primarily for doctors, it may also be useful to certain other people who are also concerned with work on strictly medical literature. Foremost among these is the doctor's secretary. The book may also be useful to those who are teaching medical writing in medical colleges, or to those who assist physicians in various ways in the preparation of their books or papers.

Books Received

Experiment Perilous. By RENEE C. FOX. Glencoe, Illinois: The Free Press, 1959. 257 pp. $5.00.

Soil, Grass and Cancer. By ANDRE VOISIN. New York: Philosophical Library Inc., 267 pp. $15.00.

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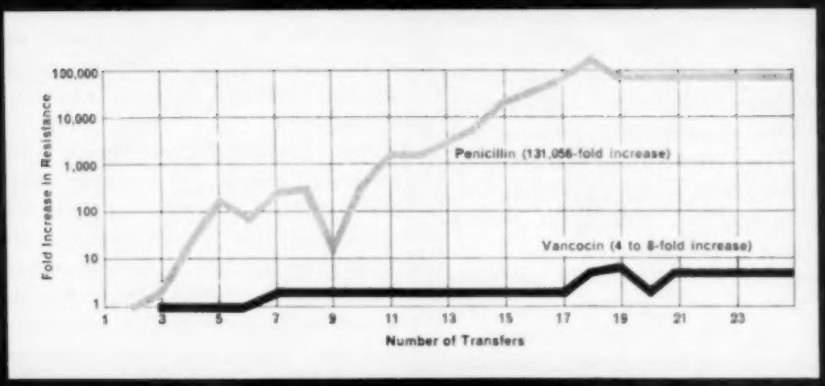

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NEWS FROM THE MEDICAL SCHOOLS

Albany

A grant of $1,253,103 to the Albany Medical College has been approved by the Department of Health, Education, and Welfare for the cost of research quarters and facilities in a $3.3 million medical science building which the college will erect. A five-story building, containing laboratories, classrooms, and administrative office, is contemplated. The Federal grant is marked for appropriation during fiscal year 1961. Construction will begin soon after the Federal grant becomes available.

Dr. CHARLES M. LANDMESSER, professor and chairman of the department of anesthesiology and anesthesiologist-in-chief at Albany Hospital, has been named President-elect of the New York State Society of Anesthesiologists.

Arkansas

STORM WHALEY, Acting President of the University of Arkansas, assumed the post of Vice-President for Health Sciences and Assistant to the President March 1. Whaley will report to the President and will be responsible for the operations of the Schools of Medicine, Nursing, Pharmacy and the University Hospital. According to L. C. Carter, chairman of the university's board of trustees, the creation of the vice-presidency will strengthen the administrative structure of the Medical Center as Mr. Whaley will assume charge of the managerial and public relations activities, thus freeing the professional scientists and educators of these duties.

Columbia

Dr. CALVIN H. PLIMPTON, assistant dean of the College of Physicians and Surgeons, has been elected President of Amherst College. Dr. Plimpton, a practicing physician in New York, will succeed Charles W. Cole, who retires in June as Amherst's 12th President. Dr. Plimpton is a graduate of Phillips Exeter Academy, Amherst, and Harvard Medical School. He was professor of medicine, chairman of the department, and associate dean of the medical faculty at American University of Beirut, Lebanon, from 1957 to 1959.

The Columbia-Presbyterian Medical Center has announced a development program requiring the subscription of $50 million—$35 million for eight building projects and $15 million for endowment purposes to permit selective additions to teaching and clinical staffs and to support essential salary standards. Combining three items in one major building project, the plans call for an 18-story medical research building, to which $5 million was recently donated by alumnus William Black; a library; and a structure to consolidate and house non-medical services. Seven further projects include a residence hall for married students, residents and research physicians; renovation of laboratories, classrooms and lecture halls and an auditorium; rebuilding of the second and fourth floors of Presbyterian Hospital; an addition to transfer and increase doctors' offices; modernization of Babies Hospital; and the centralization of equipment for x-ray therapy within a single building. Sites for the new construction already are available within the 25-acre Medical Center.

A new research professorship in cardiovascular disease has been established at the College of Physicians and Surgeons. The chair, called the Westchester Heart Association Professorship of Cardiovascular Research, is supported partially by a grant from the Westchester Heart Association, Inc. The grant is for $10,000 each year for five years, subject to renewal at the end of

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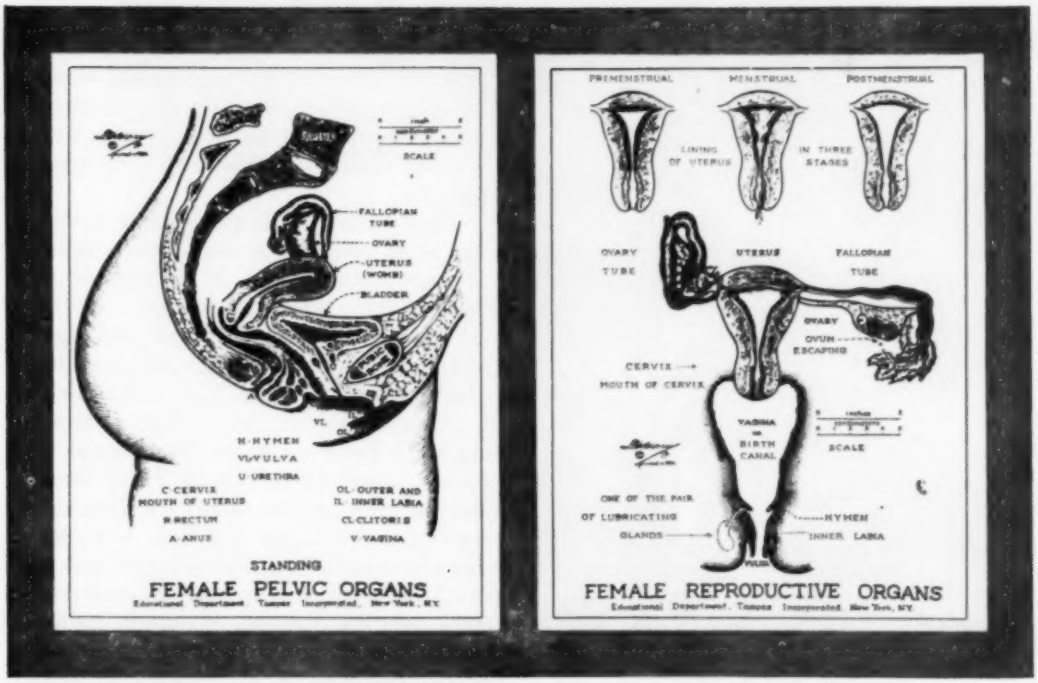

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that period. Dr. ANDRE F. COURNAND, professor of medicine and a joint winner of the 1956 Nobel Prize in Medicine, has been named first incumbent of the new professorship.

Dartmouth

A head-on collision January 29 claimed the life of Dr. ROLF C. SYVERTSEN, dean of the Dartmouth Medical School.

DR. ROLF SYVERTSEN

Dr. Syvertsen received his Bachelor's degree from Dartmouth in 1921, and at that time joined its undergraduate faculty as an instructor in biology. At the same time he was a graduate student in the Dartmouth Medical School, receiving a Certificate in Medicine in 1923. He was made an assistant professor of anatomy in 1932 and became a full professor in 1938. In the interim, he attended Rush Medical School at the University of Chicago, receiving his M.D. degree in 1936. He was made Dean of the Medical School in 1945.

Dr. STEPHEN MARSH TENNEY will take over the reins as Dean of the Medical School. Dr. Tenney joined the school's staff in 1950 as a teaching fellow in the physiological sciences and in 1951 moved to the University of Rochester's faculty where he remained until 1956, returning to Dartmouth as professor of physiology. During the academic year 1956–57 he served as associate dean and in 1957 was named Director of Medical Sciences.

Hahnemann

Hahnemann Medical College and Hospital has announced a ten-year, $15 million program of construction designed to provide, in the first phase of the plan, a clinical research building, a surgical pavilion, and a student nurses' residence and classroom building.

Eight major buildings covering medical education, medical research and patient care are contemplated. In addition to the "first phase" buildings, the over-all plan calls for a new medical college building, a resident and intern residence, an outpatient clinic, patient pavilion, plus other related buildings. The master plan calls for the razing of all Hahnemann buildings except the present hospital structure on Broad Street, built in 1928, and the Klahr building, constructed in 1938. The buildings to be torn down were all built previous to 1890 and are inefficient to operate and are designed poorly to meet the demands of modern medical education and research, according to Hahnemann's President, A. WATSON MALONE, III. Construction is expected to begin in June, 1960.

Harvard

A gift of $100,000 a year for 10 years from General Foods Corporation will provide for expansion of the nutritional research laboratories of the Harvard School of Public Health. The new four-story nutrition laboratory, where biological and medical sciences will be applied to human nourishment and its relation to heart disease, obesity and other public health problems, will be part of a projected 15-story research structure for the School of Public Health in Boston. Construction is expected to get under way this spring for the new building, which will be

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financed in part by a grant of $1,450,000 from the National Institutes of Health.

The first advanced course in the comparative anatomy of primates to be offered by Harvard University will be given at the Medical School during the Spring semester. This course is designed for graduate students in anthropology, biology, and paleontology, but will be open to qualified undergraduates. The course, under the direction of Dr. GEORGE E. ERIKSON, assistant professor of anatomy, will be a cooperative offering of the departments of anatomy and anthropology.

Johns Hopkins

A short course in medical genetics will be conducted at Bar Harbor, Maine, August 8–20, 1960 by members of the faculty of the School of Medicine and the staff of the Roscoe B. Jackson Memorial Laboratory. Forty participants can be accommodated. The course is designed primarily for persons in medical training and research. Further information can be obtained from the co-directors of the course: Dr. VICTOR A. MCKUSICK, Johns Hopkins Hospital, Baltimore 5, Md., and Dr. JOHN L. FULLER, Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine.

Kansas

Dr. E. GREY DIMOND, professor of medicine and chairman of the department, will leave the Kansas medical faculty on July 1, to head a new laboratory, now under construction in LaJolla, Calif., by the Scripps Research Foundation. Since 1950, Dr. Dimond has directed the development of the cardiovascular laboratory at the Medical Center. He has been chairman of medicine since 1952.

Louisville

The Kentucky State Medical Association has appropriated $10,000 to the University of Louisville and the University of Kentucky Schools of Medicine for the purpose of sponsoring an active program of postgraduate education. A cooperative venture, Dr. FRIEDRICH HERTLE has been appointed full-time director of the program.

Maryland

Dr. WILLIAM DEWEY BLAKE has been appointed professor of physiology and head of the department. Dr. Blake comes to Baltimore from the University of Oregon, where he was associate professor of physiology since 1952.

Medical Evangelists

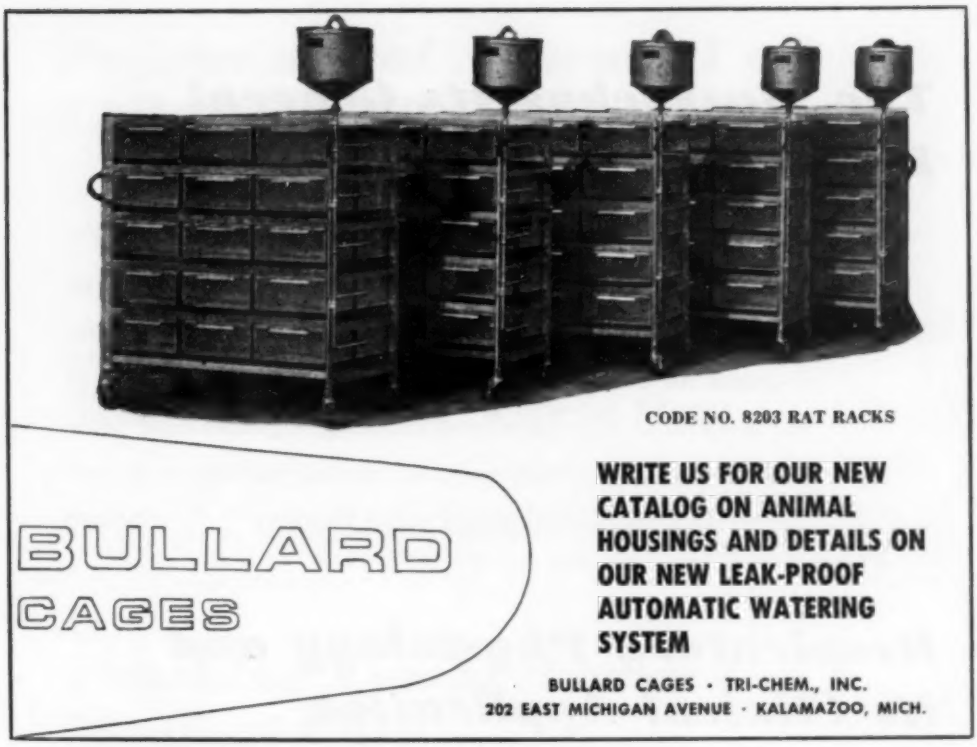
A member of the College of Medical Evangelists staff, KARL FISCHER, left recently for East Africa to launch a new research and preventive medicine program there. He will join a team of health and medical specialists who will locate at Heri Hospital, field headquarters for the program. The Research and Assistance Program, as the project is called, dates back to 1956 when six CME scientists made a comprehensive medical survey of East Africa. This survey was continued during the summer of 1957 and the latter part of that year the scientists recommended that CME undertake a four-year research and preventive medicine program. Financed by grants from private and governmental agencies and by internationally-minded philanthropists, purpose of the program is to give medical assistance with emphasis on health education and preventive medicine. A continuous research effort will be aimed at gathering information about local tropical diseases and their causes.

Miami

The School of Medicine dedicated its new building on March 3, in an outdoor ceremony at the Medical Center in Miami. The building provides laboratory facilities for all departments of the school.

Michigan

The University of Michigan Medical Center dedicated a new $1.5 million Mental Health Research Institute building recently.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The Institute was established in temporary quarters four years ago. According to university officials, its purpose, which will be accelerated in the new building, is a concerted attack on basic elements of mental illness, a health problem estimated to cost the American people an annual loss of $3 billion and 325,000 man-hours.

Minnesota

Occupancy of Diehl Hall, the university's new bio-medical library building, is now anticipated for October, 1960. Three floors of the $2.5 million structure will house library facilities, while two floors below ground level will house research laboratories for certain clinical departments. Named for the Medical School's Dean Emeritus, HAROLD S. DIEHL, it will add needed research and study space to the University of Minnesota Medical Center. Another building, the Jackson-Owre Hall, will be completed during the summer of 1960. It will be shared by the Medical School and the School of Dentistry. The Medical School's half will provide research space for the departments of anatomy and pathology, and release current research space in Jackson Hall for additional classroom space.

New York University

The Regional Hospital Plan of New York University-Bellevue Medical Center has been extended to Hackensack Hospital of Hackensack, New Jersey. The Plan was established in 1947 with the purpose of bringing a program of continuing medical education and training to suburban and rural areas through local community hospitals. Hackensack Hospital services an area of 400,000 people in a section of Bergen County. It contains 400 beds and each year treats approximately 17,000 inpatients and 40,000 outpatients.

North Carolina

Dr. CHARLES H. BURNETT, professor and head of the department of medicine, has

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APPLICATION OF A TWIN ANALYSIS

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By KENNETH R. HAMMOND and FRED KERN, Jr., M.D. With a foreword by WARD DARLEY. This study by two psychologists discusses the controlled study of outpatient teaching at the University of Colorado, where the physician assumed responsibility for the patient's total health, instead of specializing. $10.00

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been granted a one-year leave of absence beginning July 1, to engage in research at the University of London, England and the Galton Laboratory for Human Eugenics. At the same time, Dr. CARL W. GOTTSCHALK will receive a year's leave to engage in research at the Biochemical Institute of the University of Copenhagen, Denmark.

Northwestern

Dr. JOHN A. D. COOPER, associate dean of the Medical School, recently was appointed a member of the Puerto Rico nuclear center medical advisory committee. The committee will advise the center, operated by the U.S. Atomic Energy Commission and the University of Puerto Rico, on biological and medical aspects of its nuclear program. Dr. Cooper is also professor of biochemistry at Northwestern and visiting professor of biochemistry at several South American universities.

Construction of a new student health center for Northwestern's Evanston campus, to be built at an estimated cost of $1 million with equipment, is scheduled to begin about the middle of March. To be named the Searle Student Health Center, the new building will contain out-patient clinical facilities and general offices on the main floor, and a 44-bed infirmary on the top floor. The level below the main floor will contain a small dining room, nurses' lounge, a special laboratory, and classroom and storage space. The first floor will also contain a medical library. The project was made possible by an $800,000 gift from John G. Searle, president of G. D. Searle and Co., Chicago.

Seton Hall

Dr. BENEDICT J. DUFFY, JR., has been named professor and chairman of the department of preventive medicine and community health. Dr. Duffy comes to Seton Hall from Georgetown University School of Medicine where he had been director of epidemiology and a member of that school's faculty since 1953.

Temple

Several faculty members of the School of Medicine have been appointed to major local and national offices. Dr. LOWRAIN E. MCCRAE has been named President-elect of the American Urological Association; Dr. RICHARD A. KERN will take over the Presidency of the Association of Military Surgeons of the United States; Dr. W. EMORY BURNETT has been named President of the Philadelphia Academy of Surgery; President-elect of the U.S. Section of the International College of Surgeons is Dr. HARRY E. BACON; and President-elect of the American Academy of Allergy is Dr. GEORGE BLUMSTEIN.

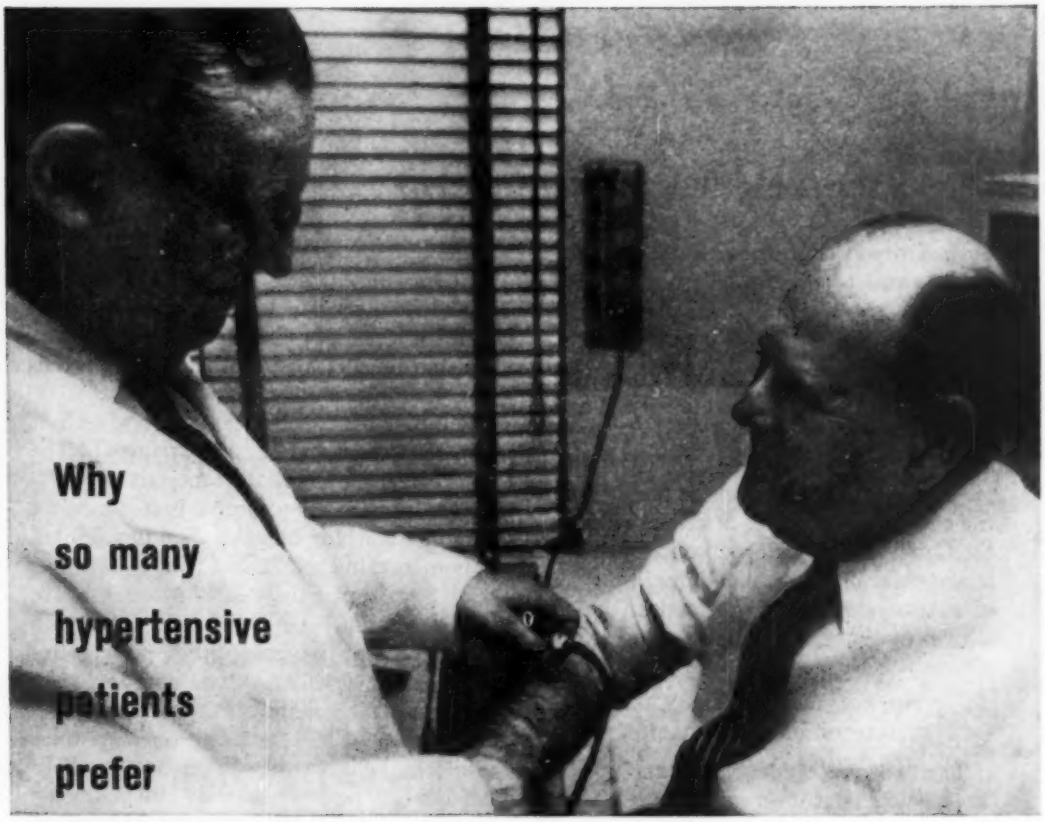
Tulane

An innovation in the second year of the medical curriculum was instituted this semester at the Tulane School of Medicine. It is a series of 12 lectures with follow-up seminars on the general problem of growth. Participants in the course include representatives of medical and behavioral sciences and the humanities. Dr. RALPH PLATOU, professor and chairman of the department of pediatrics, served as chairman of the committee to design the course.

Vanderbilt

A symposium on Radioactivity in Man, Measurements and Effects of Internal Gamma Ray Emitting Radioisotopes will be held at the university April 18–19. The conference is sponsored by the Section on Medical Sciences of the American Association for the Advancement of Science and was made possible by a grant from the United States Steel Foundation to the Association, and supported in part by the Division of Biology and Medicine of the Atomic Energy Commission, and Public Health Service, and the Army Medical Research and Development Command.

Further information may be obtained by writing to Dr. GEORGE R. MENEELY, Vanderbilt University School of Medicine, Nashville, Tenn.



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*Herrmann, G. R., Vogelpohl, E. B., Hejtmancik, M. R., and Wright, J. C.: J.A.M.A. 169:1609 (April 4) 1959.

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ITEMS OF CURRENT INTEREST

56th Annual Congress on Medical Education and Licensure

Approximately 1,200 medical educators, hospital administrators, government officials, and practicing physicians attended the 56th annual Congress on Medical Education and Licensure February 6–9, at the Palmer House, Chicago. The role of the patient in medical education highlighted discussions at the three-day meeting. A special feature of the Congress was the observance of the 50th anniversary of the publication of the results of a two-year study of American medical schools by Abraham Flexner.

THE ROLE OF PATIENT CARE IN BASIC MEDICAL EDUCATION

The two greatest developments in American medical education in the past 50 years have been the acceptance of the basic sciences as the foundation of medical practice, and the introduction of the student in his clinical years to the wards and outpatient clinics as a full-fledged member of the health team, asserted Dr. Arthur Richardson, dean of Emory University's School of Medicine at the opening session. It is a universally accepted fact that adequate clinical teaching can be accomplished only if the student is made to feel that he has a responsibility for "his" patient. With the acceptance of this concept of medical education as the welding together of an accumulation of knowledge, as well as the development of a sense of responsibility, medical schools assumed a role of performing medical service, he said. Dr. Richardson held that whether they are public or private, every medical school today is at the very least a quasi-public institution which must be sensitive to the health needs of the society it serves and from which it derives its sustenance. He further believes that in these days of expanding research grants, it is easy to forget that the single central function of a medical school is education. He maintains it is possible for a school to have too much research and too much service with too little attention on education.

Guy D. Hayes, Assistant Director, Division of Medical and Natural Sciences of The Rockefeller Foundation, contends that patients, by and large, receive better medical care in a teaching hospital than in affiliated or non-teaching hospitals. Citing the various reasons, he noted that teaching exercises are more numerous, the staff is selected from a highly competitive group, there is more research over a wider scope, and the very existence of teaching forces staff and students alike to be constantly on their toes. While he believes the patient cannot help but benefit, he feels there is still room for improvement. Mindful that the daily ward rounds constitute one of the most valuable teaching devices available to students and staff alike, Dr. Hayes observed that it can also be a traumatic experience for the patient. "This can be minimized by a staff that is both considerate and alert," he said.

PATIENT CARE IN EDUCATION BEYOND MEDICAL SCHOOL

The medical curriculum needs a revamping to meet future requirements, according to Dr. William D. Holden, chairman of the department of surgery at Western Reserve University School of Medicine. An organized educational program is required for the interns and residents if they are to mature intellectually and grow professionally as rapidly as possible, he said. He urged for more responsibility on the young graduate physician to better train him for later years. Dr. Holden cited the steps that must be taken for a proper educational program: selection of highly and properly motivated

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graduates; the availability of patients for whom the residents can assume responsibility; the establishment of high standards of performance; and an objective attitude on the part of the teaching staff which would provide the opportunity for the resident to use his own initiative to learn the practice of medicine.

Reporting the results of a recent survey wherein 1950 graduates of medical schools were queried on what they did or did not get out of their medical school experiences, Helen Hofer Gee, Ph.D., found that the physician-patient relationship is a problem that warrants the concern of all medical educators.

Probing into the deficiencies of the medical curriculum before the advent of comprehensive care teaching, Dr. Gee, Director of Research, Association of American Medical Colleges, reminded her audience that though much attention has been given the problem of physician-patient relationship during the past decade, "confusion still exists," she said. Dr. Gee believes the fault lies not in a confusion of ultimate aim, but in a confusion of knowledge and beliefs with respect to what comprehensive care is, what can or cannot be taught, and who should teach. Posing the questions, "which aspects of these problems are rooted in philosophy and which in science?" and "to what degree is patient care a function of the physician's medical knowledge, of his attitudes, and of his basic personality structure?" Dr. Gee contends that humanitarian concern with the welfare of the patient has been thoroughly confused with knowledge of psychological and sociological components or organic disease processes, and both of these with how skill in dealing with the personal and emotional problems of patients may be developed.

MEDICINE AS A UNIVERSITY STUDY

The memory of an educator who rocked the nation with his report on the "scandalized" conditions of American medical schools was honored Monday, February 7, as the Congress went into its second day of sessions.

It was in 1910 that Abraham Flexner published the results of a two-year study of medical schools which he made at the request of the American Medical Association and the Association of American Medical Colleges. The report, disclosing shameless conditions, was directly responsible for the closing of approximately 55 inadequate medical schools and resulted in a general tightening of medical teaching standards and practices.

"Medicine's debt becomes our debt when we consider that Dr. Flexner made it possible for us to see clearly the direction of our efforts in medical education," the President of the A.M.A. said at the special program devoted to Dr. Flexner. Dr. Louis M. Orr recalled the findings and subsequent achievements of the man who revolutionized American medical training.

LOOKING TOWARD TUMORROW'S MEDICAL STUDENT

Space missiles are causing grave problems for the nation's medical profession, warned a member of the A.M.A.'s board of trustees. Dr. James Z. Appel, Director of the Health Department, Franklin and Marshall College, Lancaster, Pa., pointed out that as the world progresses further into the age of technology, the competition for medical students will become more serious. Formal campaigns have already been instituted by other professions to attract students away from medicine, he declared. Dr. Appel urged for a recruitment program by the medical profession and offered four points upon which the program should be based: the medical career should be made attractive to the potential student; the primary and secondary education system should be improved in order to increase the number of qualified students for medical schools; the length of time a student spends in medical school must be shortened; and the cost of medical education must be adjusted so that no student who is properly qualified and

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"Dermatologic functions and conditions are given a clear and interesting description, enhanced by many vivid illustrations. There are, in addition, excellent chapters on diagnostic procedures, laboratory techniques, and general aspects of therapy."—*Scope Weekly*

By HARRY M. ROBINSON, JR., *B.S., M.D., Professor of Dermatology and Head of the Division of Dermatology, University of Maryland School of Medicine; Chief Dermatologist, University Hospital; and* RAYMOND C. V. ROBINSON, *B.S., M.D., M.Sc.(Med.), Associate Professor of Dermatology, University of Maryland School of Medicine; Assistant Chief of the Dermatology Clinic, University Hospital*

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By JACKSON A. SMITH, *M.D., F.A.C.P., Clinical Director, Illinois State Psychiatric Institute, Chicago, Illinois; Former Professor of Neurology and Psychiatry, University of Nebraska College of Medicine, Omaha, Nebraska*

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mentally able is prevented from securing an education. He cautioned that any recruitment program should not lower the quality of the physician produced. "If anything, the program should include methods for increasing this quality."

FOREIGN M.D.'S CREATING PROBLEMS

The influx of thousands of young foreign physicians to assume internships and residencies in the United States has created a new problem for medical education, the associate director of the Rockefeller Foundation said at the closing session of the Congress. Dr. John M. Weir charged that graduates coming here for clinical training arrive without previous practical experience in patient care, and have been trained in a tradition which fails to give them the practical responsibility for patient care and diagnosis which is routine in resident staffs of our hospitals. Another drawback he cited is the fact that foreign universities are graduate rather than undergraduate schools in the American sense. "Students therefore go directly from secondary school to graduate work as medical students, and consequently, enter medical school without a sound base of biology, chemistry, physics, or mathematics suitable for graduate study in medicine." He maintains that while the results of the ECFMG examination give a reasonable measure of the technical knowledge of the students, it doesn't measure the capacity. He therefore suggests that the hospitals either alone or in groups, take ultimate steps in providing training through clerkships under supervision, combined with a review of basic science along the lines adopted by Cornell University Medical College before assignment of medical graduates as house officers. In closing, he stated, "In the end, this will improve materially the medical care supplied by the hospitals, provide a better base for graduate teaching of all the house staff, and most important of all, raise the standard of graduate education of foreign students who have honored us by applying for training in our hospitals and schools."

The three-day conference was sponsored by the American Medical Association's Council on Medical Education and Hospitals, the Advisory Board for Medical Specialties, and the Federation of State Medical Boards of the United States.

Dr. E. L. Turner Dies

Dr. Edward L. Turner, director of the American Medical Association's division of scientific activities, died unexpectedly February 4, in St. Francis Hospital, Evanston.

Dr. Turner served as secretary of the Council on Medical Education and Hospitals of the A.M.A. before taking over his present post, which he had held for a year. As director of the division of scientific activities, he supervised the councils on medical health, scientific assembly, medical education and hospitals, the American Medical Education Foundation, and the department of therapy and research.

Before joining the A.M.A. in 1953, Dr. Turner was dean of the University of Washington School of Medicine, Seattle, which he helped organize in 1945. He also had served as president of Meharry Medical College and was on the faculty of American University in Beirut, Lebanon. Dr. Turner interrupted his work in Beirut to serve on the house staff of Billings Hospital at the University of Chicago for a year. When he returned to the middle east in 1931, he conducted a teaching and research program.

American Cancer Society Sponsoring Free Lectures

The American Cancer Society is announcing sponsorship, on an experimental basis and without cost to universities and colleges, of a series of lectures on research for the purpose of stimulating a greater number of students, who are capable of doing so, to undertake careers in the medical, biological and/or related physical sciences, and of improving public understanding of the methods and unmet needs and opportunities for productive research in these fields. The investigators who have agreed to col-

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laborate with the Society in this experiment include: Dr. Bernard D. Davis of Harvard, who will cover "Microbes and the Unity of Biology"; Dr. Harry Eagle of the National Institute of Allergy and Infectious Diseases —"The Metabolism of Normal and Malignant Cells in Culture"; Dr. Alfred Gelhorn of Columbia University's College of Physicians and Surgeons—"Progress and Potentialities of Human Cancer Prevention"; and Dr. Arnold D. Welch of Yale whose subject will be, "Metabolic Approaches to Cancer Chemotherapy."

Each of the speakers has agreed to accept no more than five invitations to visit university or college campuses within the twelve months following September 1, 1960. They will be prepared to address a meeting of students, faculty and interested attendant public on the subject indicated and if desired, would consider participation in seminars with students and faculty and counseling with students who may be interested in careers in these fields. September 1, 1960 is the deadline date for receipt of invitations.

Invitations for any of these speakers should be addressed to the American Cancer Society, 521 West 57th St., New York, N.Y., and should include the name of the speaker desired, description of the nature and size of the audience expected, the suggested date, time and place of the address, and a statement of the arrangements which would be made for seminars and other meetings with members of the faculty and student body.

A.M.A. Initiates Action on Medical Scholarships

The American Medical Association initiated action recently on the establishment of a scholarship program for medical students with the appointment of a special study committee. William F. Norwood, Ph.D., chairman of the division of legal and cultural medicine, College of Medical Evangelists, was named staff director, and Dr. L. S. McKittrick, clinical professor of surgery, the Harvard Medical School, will serve as chairman of the study committee. The group will make its first report at the annual meeting of the A.M.A. in Miami next June. The scholarship program is designed to aid and encourage deserving students to enter the field of medicine.

New Director Appointed to Cancer Study

The appointment of Dr. Frank L. Horsfall, Jr., vice-president of the Rockefeller Institute, as president and director of the Sloan-Kettering Institute for Cancer Research was announced recently by Dr. Warren Weaver, chairman of the board of trustees. The position of director was held by Dr. C. P. Rhoads from 1945, when the Institute was founded, until his death last August. Dr. Horsfall will serve as chief executive officer of the Institute. Dr. Weaver also announced that Dr. C. Chester Stock, who has been associate director, will assume the new post of scientific director. Dr. A. R. T. Denues, who has served as acting director since Dr. Rhoads's death, will become a vice-president.

Foreign Interns Must Be Certified by July 1

All graduates of foreign medical schools serving as interns or residents in American hospitals on July 1, must be certified by the Educational Council for Foreign Medical Graduates, the American Medical Association announced recently. This implements a policy statement made in the A.M.A. Journal in 1958, which was reaffirmed by the Association's House of Delegates in December, 1959.

After July 1, the statement read, no hospital should expect to maintain an approved internship or residency program unless its foreign graduate appointees have a full and unrestricted state license to practice; are in their final six months of training; have secured a standard or temporary certificate from the A.M.A. Educational Council, or have been given a contingent appointment

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for not more than six months based on their having been accepted for the September, 1960, medical qualification examination.

C. Judson Herrick Dies

Dr. C. Judson Herrick, prominent neurologist, author and educator, died January 29, at his home in Grand Rapids, Mich. He was 91 years old. Dr. Herrick had taught at the University of Chicago for 30 years and was an extensive author and lecturer.

New Program for American College of Surgeons

A grant of $146,275 by the John A. Hartford Foundation, Inc. of New York, to the American College of Surgeons to inaugurate a program for improving the medical management of the surgical and injured patient was announced recently by the College. According to Dr. I. S. Ravdin, chairman of its Board of Regents, the grant will permit the College to enlarge its long-established activities in the field of trauma, both at the national and local levels.

The new program will permit immediate establishment of pilot projects in selected cities, employment of a field staff to provide personal guidance—both to the public and to the profession—throughout America, and initiation of an evaluation program, all with the primary goal of improving care of the surgical and injured patient.

NIH Establishes New Program

The National Institutes of Health has announced the establishment of a new graduate training program in microbiology. Under the chairmanship of Dr. Morris F. Shaffer, Tulane University School of Medicine, the Committee will serve to review training grant applications in microbiology and related fields. It will function under Dr. G. Halsey Hunt, Chief of the Division of General Medical Sciences, and Dr. Frederick L. Stone, Assistant Division Chief and Chief of the Research Training Branch. The microbiology program is designed to support training at predoctoral and postdoctoral levels in medical schools, schools of public health, veterinary schools, other recognized graduate schools, research institutions and hospitals in the basic aspects of microbiology, bacteriology and virology.

Congress Appropriates $1.5 Million to Fight Cancer

A sum of $1.5 million has been appropriated by the Congress of the United States for the fiscal year 1960, to further the widespread application of existing knowledge of preventing and controlling cancer. Of this amount, $321,894 has already been awarded by the Public Health Service to support Community Cancer Demonstration Projects. Purpose of the studies financed by the grants is to shorten the interval between discoveries in research and the application of these findings at the community level.

Research Fellowships Available

The Helen Hay Whitney Foundation is announcing the availability of fellowships to any properly qualified person in the United States or abroad, up to the age of 35, holding the degree of M.D., Ph.D., or their equivalent, who is seriously considering a career in biological or medical research, preferably relating in some eay to connective tissue and its diseases. The fellowships are annual, subject to renewal consequent to good performance for a period of three years. Further information may be obtained by writing to the Helen Hay Whitney Foundation, 525 E. 68th St., New York 21, N.Y.

Research Scientists Gain Support

The National Institutes of Health, the Public Health Service research center at Bethesda, Md., announces the award of 20 grants, totaling $733,143 to support the training of research scientists in basic medical and health-related sciences. These awards, part of an NIH effort to stimulate more research training in the scientific fields basic to medicine and public health, were made to institutions and universities in 16 states to provide support for the training of

Individual Membership

in the

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In recent years the activities of the Association of American Medical Colleges have expanded far beyond the original considerations of administrative problems to the many and varied problems of medical education as encountered by the entire medical school faculty.

The expansion of activities has been due to the growing complexity of medical education —the swift development of the medical sciences, the rapid accumulation of new knowledge to be taught, the pressure for more graduates, the changing patterns of medical care, and countless other factors.

Because of these factors, the AAMC recognizes the need for a professional organization to represent not only the medical schools but the faculty members of these schools. Through the offering of individual membership, the AAMC provides you with the opportunity to exchange ideas, opinions and information through the Annual Meeting, Teaching Institutes, and other activities of the Association.

The AAMC also encourages you to attend the Annual Meeting, not only to meet with others who are teaching in your field and discussing the educational problems that are peculiar to it, but also with the idea of becoming familiar with the entire field of medical education as one of society's most important enterprises. The time has come when teachers of medicine must meet together and discuss the problems and activities that are peculiar to medicine as education just as they are accustomed to meet and talk about medicine as science.

As an Individual Member you are entitled to receive *The Journal of Medical Education*, the only publication devoted exclusively to medical education. The Journal also carries the latest news from the medical schools and provides a valuable service through its Personnel Exchange column. You receive the yearly *Directory*, the Proceedings of the Annual Meetings, and *The Medical Mentor*, a newsletter which will keep you informed on items of current interest in the field of medical education, both nationally and internationally.

Individual Membership, at only $10 a year, is open to any person who has demonstrated a serious interest in medical education over a period of years. All the privileges of membership and a provisional membership card are granted immediately after payment of the $10 fee, although confirmation must await official action at the next Annual Meeting.

To obtain membership, fill out the application form below, append check for $10, and return to the Association's central office at 2530 Ridge Ave., Evanston, Ill.

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graduate students and postdoctoral trainees in a number of basic sciences, including embryology and development, biochemistry, physiology, microbiology, medical genetics, anatomical sciences, pharmacology, basic multidisciplinary and cell biology.

Foreign Fellowships Receiving Widespread Attention

Final selection for the 1960 Smith Kline & French Foreign Fellowships for Medical Students will be made in April, according to Dr. Robert A. Moore, chairman of the Selection Committee.

Considerable interest in the foreign fellowships has been evinced by medical students since the Association of American Medical Colleges announced their availability. A grant from Smith Kline and French Laboratories will provide selected medical students with a broad clinical experience, an understanding of preventive medicine as practiced abroad, an opportunity to study diseases not common to the United States, and a definite awareness of the acute need for American physicians and their medical knowledge abroad. Dr. Moore, who is President and Dean of the State University of New York Downstate Medical Center, warned that students should be cautioned that applications must be in their Dean's office no later than April 1, 1960, if they are to be considered for a 1960 fellowship.

The three-year program, which is being administered by the A.A.M.C. will enable senior students enrolled in United States medical schools to travel abroad to work for a limited period of time in remote areas of the world.

PUBLICATIONS

Useful information for both medical educators and students is published by the Association of American Medical Colleges. These publications may be obtained from the Association headquarters office, 2530 Ridge Avenue, Evanston, Ill.

Books and Pamphlets

Admission Requirements of American Medical Colleges—1958–59 ($2.00).

History of the Association of American Medical Colleges—1876–1956

The National Health Service of Great Britain ($1.00).

El Estudiante de Medicina ($1.00)

Suggestions for Supplementing the Medical Curriculum in Time of National Emergency

A Study of Medical College Costs ($1.50)

The Journal of MEDICAL EDUCATION

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Journal supplements available:

Education of Physicians for Industry ($2.00).
Support of Research by American Cancer Society ($1.00).
Survey of Women Physicians graduating from Medical School 1925–40 ($1.00).
Medical Education for Foreign Scholars in the Medical Sciences ($1.50).

Teaching Institute Reports ($2.00 paperbound, $3.00 clothbound).

Report of the Conference on Preventive Medicine in Medical Schools (Report of the 1952 Institute).

The Teaching of Physiology, Biochemistry and Pharmacology (Report of the 1953 Institute).

The Teaching of Pathology, Microbiology, Immunology and Genetics (Report of the 1954 Institute).

The Teaching of Anatomy and Anthropology in Medical Education (Report of the 1955 Teaching Institute).

The Appraisal of Applicants to Medical School (Report of the 1956 Institute).

The Ecology of the Medical Student (Report of the 1957 Institute).

Report of the First Institute on Clinical Teaching (Report of the 1958 Institute).

Medical Audio-Visual Institute Publications

Film Catalog, Fall 1955 and Supplements.

Films in Psychiatry, Psychology and Mental Health (available from the Health Education Council, 92 Belmont Drive, Livingston, N.J.).

Films in the Cardiovascular Diseases (Part I available from the American Heart Assn.), 44 E. 23rd St., New York 10, N.Y. ($2.00).
Part II available from the Medical A-V Institute ($2.00).

Publications of Related Organizations

Hospitals Participating in the Matching Program 1959 (NIMP).

Results of the Matching Program 1959 (NIMP publication).

The Student and the Matching Program 1959 (NIMP publication).

Medical College Admission Test—Bulletin of Information 1959 (Educational Testing Service publication).

Psychiatry in Medical Education—1951 Conference ($1.00).

The Psychiatrist: His Teaching and Development—1952 Conference ($2.50).

(The above can be obtained from: American Psychiatric Assn., 1785 Massachusetts Avenue, NW, Washington, D.C.)

PERSONNEL EXCHANGE

Faculty Vacancies

PSYCHIATRIC SOCIAL WORKER: Full time appointment as assistant professor of psychiatric social work in department of psychiatry. Duties will include some administrative responsibility, supervision and teaching in the undergraduate program of the medical school and in the residency training program. Salary, $7500 per annum. Interested applicants should send curriculum vitae and a recent photograph to Mrs. Imogene S. Young, Director, Psychiatric Social Work Services, University of Maryland Medical School, Baltimore 1, Maryland.

DIRECTOR OF INTERN EDUCATION: Physician director of Intern Education needed for 300-bed hospital. Salary $10,000 per annum, plus extra stipend for research fellowship. Write Dalton M. Welty, M.D., Washington County Hospital, Hagerstown, Md.

VIROLOGIST: Positions available for two individuals with B.S. or M.S. degrees with background in virology. Positions are in a research laboratory associated with a medical school. Address: V-82.

IMMUNOLOGIST-IMMUNOCHEMIST: Position as Research Associate is available for full-time investigations in the field of thyroid immunology and protein chemistry. Ph.D. or M.D. with training in protein manipulations and/or immunologic procedures. Salary $6,000 to $8,000, depending on background. Interested candidates should send a complete curriculum vitae and recent photograph to Dr. Sidney Shulman, Department of Bacteriology and Immunology, University of Buffalo School of Medicine, Buffalo 14, N.Y.

PSYCHIATRIST: Assistant or associate professor of psychiatry required. This position will be that of geographical consultant with a salary and rank according to experience and qualifications (within the range of $7,700 to $10,200) and private consulting privileges. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

CHILD PSYCHIATRIST: Assistant or associate professor in child psychiatry required. This position will be that of geographical consultant with a salary (within the range $7,700 to $10,200) according to experience and qualifications, and private consulting privileges. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

PSYCHIATRIST: Lecturer in psychiatry required. Salary (within range of $6,000 to $8,000) and consulting privileges, according to experience and qualifications. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

HEMATOLOGY: M.D. (young) to do research in modern diagnostic methods in hematology and allied diseases in collaboration with medical and engineering groups. Address: V-83.

MEDICAL DIRECTOR: Coordinator of medical education for a 300-bed major teaching hospital of a New England medical school. Academic appointment dependent upon qualifications. Consultation practice or research possible. Address: V-84.

PSYCHIATRIST: Board certified with university and state hospital experience to serve as supervisor of psychiatric residents for newly approved three-year program with time divided equally between University of Washington and Northern State Hospital. Position will carry faculty rank at the medical school and residence in Seattle is feasible. Present staff at Northern State Hospital is currently expanding from 25 full-time positions to an authorized strength of 35 positions for 1670 patients. Salary $14,220–$16,836. Address: Charles H. Jones, M.D., Box 309, Sedro Woolley, Washington.

MEDICAL DIRECTOR: Professional Services, large affiliated VA General Hospital. Certified specialist with more than casual experience residences and research, and flair for administration. Faculty appointment appropriate for qualifications. Active expanding research program. Ambitious, mature personality. Salary, $14,685–$16,000. Address: V-85.

OBSTETRICIAN-GYNECOLOGIST: Full-time teacher, administrator and investigator for department with active student and house staff program in well known medical school and affiliated hospitals in New York City. Must be interested in academic medicine. Rank and salary will depend upon qualifications. Age—preferably under 35. Address: V-86.

BACTERIOLOGIST: University Hospital at Saskatoon, Saskatchewan, Canada, now has a vacancy for an assist ant bacteriologist. This appointment also carries a university teaching position. Salary $8,000–$10,000 per annum. Applicants should have hospital and teaching experience. Applications stating date of birth, qualifications, experience, present appointment, and the names of three references should be sent to the Director of Bacteriology, University Hospital, Saskatoon, Saskatchewan, by April 15, 1960.

NEUROLOGIST-INFECTIONIST: For geographical full-time position in a 400-bed general hospital with medical school faculty appointment. Duties to include teaching; research will be encouraged. Large Eastern city. Address: V-87.

INTERNIST: Board eligible or board certified, to work with a team in the supervision and management of cardiovascular patients on a home care research and demonstration project at East Coast medical school. Training in cardiovascular diseases desirable. Geographic full-time appointment available. Address: V-88.

ASSISTANT PATHOLOGIST: Three-hundred bed GM & S university affiliated hospital. Salary rate varies from $9,890.00 to $11,355.00 plus 15% if certified by the American Board of Pathology. Apply to J. Mendeloff, M.D., VA Hospital, Atlanta, Ga.

DIRECTOR, MEDICAL EDUCATION: Available July 1, 1960. Newly created position; 312 bed general hospital, fully approved, school of nursing; intern and resident training program. Duties include supervision of intern and resident training, supervision of medical library, serve as chairman of department of medical education, and as coordinator of conferences and all formal staff meetings. Salary open. Apply to Paul G. Wedel, Administrator, The Williamsport Hospital, 777 Rural Ave., Williamsport, Pa.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

PHYSIOLOGIST: Ph.D., 1957, age 31, married, one child. Research in cardiovascular-renal physiology. Strong background in hypertension. Eleven publications. Experience in teaching medical, dental, and pharmacy students. Desires research position with or without teaching responsibilities. Address: A-408.

MICROBIOLOGIST: Ph.D., Sept., 1959. Training in all fields of basic microbiology with research in microbial metabolism. Desires faculty position with teaching and research opportunities in a university or medical school. Address: A-409.

PHYSIOLOGIST-ENDOCRINOLOGIST: Ph.D., age 36. Training and background in endocrine, cellular, mammalian and zoological physiology. Presently assistant professor engaged in teaching and research in endocrinology and general physiology. Formerly research associate in biochemistry. Desires academic and/or research position. Address: A-410.

ANATOMIST: Age 34, married. Ph.D. Anatomy 1957. Publications. Teaching experience in Eastern medical school. Desires teaching position with opportunity for research. Address: A-411.

INTERNIST: Age 35, married. Ten years training in internal medicine and hematology. Teaching experience and research in field of clinical hematology, B_{12} metabolism, radioactive uptakes, experimental hematology, and enzyme studies. Desires teaching position with opportunity for research. Address: A-412.

SURGEON: Age 35, native of Bombay, India. In U.S. since 1952. F.C.P.S. (Bombay). F.R.C.S.E. (Edinburgh). Completed residency training in general surgery in U.S. and successfully taken Part I examination of American Board of Surgery. Desires full-time position in teaching and/or research in American medical school. Presently senior resident in surgery in Eastern hospital. Experience in plastic surgery as well as urology and anesthesiology. Address: A-413.

UROLOGIST: University trained, finished 1956. Seeking full-time academic post: teaching, research, and clinical work. Presently in private practice and part-time university teaching. Address: A-414.

GROSS ANATOMIST: D.S.D., Ph.D. Ten years teaching experience in medical school; previously taught in dental school. Clinical experience in plastic and oral surgery. Research interests and publications: homotransplantation of tissues. Desires academic position in medical or dental school with research facilities. Will consider research associateship with plastic surgery department. Address: A-415.

MICROBIOLOGIST: Ph.D. Seeking position on medical school faculty in Southeast or Southwest. Many years experience and supervision in clinical microbiology. Six years on medical school faculty. Qualified in parasitology, virology and public health. Address: A-416.

SURGEON: Age 33. Certified in surgery and thoracic surgery. University trained with research background. Presently holding part-time university teaching appointment. Desires full-time academic appointment in surgery, preferably with additional duties as assistant dean working with curriculum and postgraduate training program. Address: A-418.

INTERNIST-GASTROENTEROLOGIST: Age 42. Board certified in internal medicine and in gastroenterology. Training and experience include 4 years as Mayo Foundation Fellow, full-time instructor in gastroenterology in leading university, clinical investigation and private practice. Trained in all gastroenterological techniques and bone marrow interpretation. Qualified in hematology, peripheral vascular diseases and rheumatology. Desires academic position in internal medicine, gastroenterology, comprehensive medical care section, as Assistant Dean, or as Director of Medical Education in teaching hospital. Address: A-419.

MICROBIOLOGIST-CLINICAL PATHOLOGIST: M.D., Ph.D., age 54, married. Wide experience in teaching and research in the United States. Returning after several years of teaching in medical schools in the Far and Middle East. Textbook in course of publication. Desires research or teaching position in medical school or in teaching hospital. Address: A-420.

PATHOLOGIST-VIROLOGIST: DVM, Ph.D. Experience in comparative pathology, virology and tissue culture techniques. Also considerable experience in teaching experimental pathology to medical students. Desires teaching appointment in a medical school that would provide opportunity for completion of courses leading to M.D. degree. Address: A-421.

PSYCHIATRIST: Board certified, with training in both general clinical psychiatry and public health psychiatry (M.P.H. degree). Six years' experience in administering a community-oriented psychiatric training program in an academic setting. Broad range of personal service in teaching, supervisory, and consultative capacities. Dynamic orientation. Numerous research publications. Age under 40. Currently assistant professor at medical school. Desires full-time faculty appointment at higher level. Address: A-422.

PSYCHIATRIST: Board certified in psychiatry and child psychiatry (pending). Eight years experience in teaching at student and resident level in adult and child psychiatry in academic setting. Broadly experienced in teaching, supervisory, and consultative capacities. Analytic orientation. Nine publications. Experience in administering child guidance clinic and in community aspects of psychiatry. Has held position as associate professor of psychiatry; wishes to head up division of child psychiatry in medical school in either true or geographic full-time position. Metropolitan area preferred. Age 45; married; 4 children. Address: A-423.

PHYSIOLOGIST-PHARMACOLOGIST: M.D., Ph.D., age 40. Teaching and research experience includes six years in

pharmacology and six years in physiology, with one year training in laboratory of high polymer chemistry. Desires academic and research position in physiology or pharmacology department. Address: A-424.

INTERNIST: Board certified, university trained, with one year training in clinical cardiology and one year in cardiovascular laboratory. Presently holding position as university instructor. Desires faculty appointment with teaching and research in clinical cardiology and electrocardiography. Address: A-425.

ANATOMIST: Ten years teaching experience; all phases of medical school anatomy. Broad research interests with grant support in gross anatomy and histology. Desires university appointment. Northeast or northwest preferred. Address: A-426.

ZOOLOGIST: Ph.D., age 43, married, family. Desires teaching microanatomy in medical school. Experience: medical school teaching (medical parasitology); USPHS senior assistant scientist, foreign experience as malariologist; undergraduate teaching, including 6 years instructing pre-medical students in histology. Publications, active research program; current interest: histochemistry techniques in study of cellular basis of resistance to a parasitic infection. Willing also to instruct in parasitology, if situation permits. Available with one semester notice to present employer. Address: A-427.

ANATOMIST: M.B., Ch.B. (Witwatersrand, Johannesburg, South Africa), F.R.C.S. (Edinburgh). Age 52, desires position in medical school as senior lecturer in anatomy. Presently located at University of The Witwatersrand as official lecturer in anatomy; part-time senior lecturer in gross and applied anatomy since 1949. Publications. Surgeon to Union Defence Forces, 1940–46 with rank of major. In private practice as a general surgeon since 1946. Address: A-428.

PEDIATRICIAN: Age 40, married, 3 children, 7 years in general practice, 5 years in academic pediatrics as assistant professor. Emphasis on clinical teaching, growth and development research, and the handicapped child. Seeks relocation at associate professor level. Excellent references. Available in summer of 1960. Address: A-429.

PHARMACOLOGIST-CLINICAL: M.D., Ph.D., age 33, licensed physician. Publications, academic and industrial experience, some psychiatric training. Desires teaching position. Address: A-430.

HUMAN GENETICIST: Ph.D., age 36, seven years experience at leading human genetics center, including heredity clinic service, population surveys of hereditary traits, and statistical analyses. Fourteen publications. Desires permanent university position, preferably research and teaching. Address: A-431.

PHYSICAL BIOCHEMIST: Ph.D., Assistant Professor of Biochemistry in an Eastern medical school. Research and publications. Physical chemistry of proteins. Energetics, kinetics, and mechanism of enzymatic reactions. Protein interaction with ions and steroids. Isolation and identification of steroids. Osmometry and potentiometric studies of polyampholytes. Desires appointment with medical school or research institute. Address: A-432.

CERTIFIED INTERNIST: Age 38, experienced in diabetes, endocrinology, radioisotopes (licensed by AEC). Several years direction of medical residency training program, and radioisotope unit in large teaching hospital, and Assistant Professor of Medicine in charge of student diabetes clinics. Now in private practice. Desires return to full-time teaching hospital and/or medical school. Address: A-433.

GROSS ANATOMIST: Ph.D. Eight years teaching experience; desires academic position in medical or dental school. Available summer 1960. Address: A-434.

PHYSIOLOGIST-BIOCHEMIST: Ph.D. Faculty member medical school. Interdisciplinary major grant research program (3 technicians) in basic and clinical aspects of endocrine physiology, metabolism, biochemistry. Publications, societies, radioisotope experience, training in statistical design. References. Desires faculty career appointment teaching physiology and/or biochemistry with facilities and climate to develop research program. Address: A-435.

INTERNIST: M.D., age 35. Currently on faculty of Eastern medical school. Experience in private practice and industrial medicine. Eight months experience and training in psychiatry. Desires faculty appointment with opportunity for clinical investigation in cardiovascular diseases, as well as teaching general medicine in teaching hospital. Address: A-436.

BIOCHEMIST-ENZYMOLOGIST: Six years teaching and research experience in medical school. Currently assistant professor in Eastern medical school. Available summer, 1960. Desires relocating with appointment in medical school or research institute. Address: A-437.

PHYSIOLOGIST: Ph.D., leading university. Well trained in biological, physical and chemical sciences. Highest scholastic honors, scholarships, former National Research Council Fellow. Well developed research program on the physiology of growth and aging. Offices held in national scientific societies. Present appointment, associate professor in medical college. Currently in charge of teaching. Seeking appointment with major administrative-teaching responsibilities, with opportunity to continue expanding research study, preferably in the West. Minimum entering salary $12,000. Available Fall, 1960. Address: A-438.

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Series E Bonds

turn $18.75 into $25.00 fourteen months quicker than ever before

Here are three new reasons why today's Savings Bonds are the best ones in history:

1. ***Every Bond bought since June 1, 1959, earns 3¼% interest when held the full term. Series E Bonds now mature in 7 years, 9 months—fourteen months faster than ever before.***
2. ***Your older Bonds now earn more—an extra ½% from June 1 on, until maturity.***
3. ***All Series E Bonds, old and new, carry an automatic extension privilege now. This means they'll automatically keep earning liberal interest for 10 years beyond maturity.***

You get these new advantages, plus complete safety, guaranteed return, and protection against loss or theft. And, you can buy Bonds automatically through the Payroll Savings Plan at work. Plan to start saving with U.S. Savings Bonds now.

YOUR MONEY GROWS 33⅓% IN JUST 7 YEARS AND 9 MONTHS WITH NEW SERIES E BONDS

YOU SAVE MORE THAN MONEY

with U.S. Savings Bonds

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new
infant
formula

Enfamil*

nearer to mother's milk[1]
in nutritional breadth
and balance

In a well controlled institutional study,[2] Enfamil was thoroughly tested in conjunction with three widely used infant formula products. The investigators report: ■ good weight gains ■ soft stool consistency ■ normal stool frequency

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NEARER to mother's milk . . . in caloric distribution of protein, fat and carbohydrate

NEARER to mother's milk . . . in vitamin pattern (plus more vitamin D added in accordance with NRC recommendations)

NEARER to mother's milk . . . in osmolar load

ENFAMIL IS ALMOST IDENTICAL with mother's milk in . . .

- ratio of unsaturated to saturated fatty acids
- absence of measurable curd tension . . . enhances digestibility

Enfamil contains oleo and vegetable fats . . . does not result in sour regurgitation

1. Macy, I. G.; Kelly, H. J., and Sloan, R. E.: With the Consultation of the Committee on Maternal and Child Feeding of the Food and Nutrition Board, National Research Council: The Composition of Milks, National Academy of Sciences, National Research Council, Publication 254, Revised 1953. 2. Brown, G. W.; Tuholski, J. M.; Sauer, L. W.; Minsk, L. D., and Rosenstern, I.: Evaluation of Prepared Milks in Infant Nutrition, Use of the Latin Square Technique. To be published.

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Symbol of service in medicine